ATTACHMENT K: NECEC RARE PLANTS SURVEY NARRATIVE REPORT

Rare Plants Survey Narrative Report

Central Maine Power
New England Clean Energy Connect

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1.0 INTRODUCTION

Central Maine Power Company's (CMP's) New England Clean Energy Connect (NECEC) Project will entail the construction of a new transmission line, associated converter station, new and upgraded substations and infrastructure in northern and western Maine. The NECEC Project (Project) is proposed to cross and parallel existing transmission rights-of-way (ROWs), as well as create a new ROW (greenfield corridor), in western Maine. This includes areas in multiple municipalities and areas under Land Use Planning Commission (LUPC) jurisdiction from Beattie Township to Lewiston, to Pownal, and from Windsor to Wiscasset. Tetra Tech, in combination with TRC, was contracted by CMP to conduct a survey for Rare, Threatened, or Endangered (RTE) plant species and rare exemplary natural communities along the Project's proposed ROW, in support of its permit application.

Surveys were conducted in July 2018. This document provides a narrative description to accompany all rare plant and rare exemplary natural community findings for the Project.

1.1 BACKGROUND

CMP's NECEC Project will consist of five segments that span multiple counties and townships in central and northwestern Maine. The Project parallels an existing line north from Larrabee substation in Lewiston until it reaches the northern end of Moxie Lake, the southeast point of Segment 1, at which point the route turns west-northwest, and the proposed new ROW is located in greenfield to the Quebec, Canada border (Figure 1).

Segments 4, 5, and the southern half of Segment 3 were surveyed previously in connection with CMP'S Maine Power Reliability Program (MPRP) in the 2007 to2009 time frame, and CMP and Maine Natural Areas Program (MNAP) have agreed that these past survey efforts were sufficient for general rare plant surveys (CMP 2018). The decision was made, however, to perform new targeted surveys in areas in Segment 3 where MNAP modeling results predicted the potential presence of small-whorled pogonia (*Isotria medeoloides*). Repeating the survey search effort in these areas was deemed appropriate due to the annual variation in visible plant occurrences. Additionally, the previously identified rare plants and communities were revisited to assess current population and community conditions.

There are three plant species in Maine that are federally listed under the Endangered Species Act (ESA). Of these, only one was identified as having the potential to occur within the Project area. The official species list, obtained through the Environmental Conservation Online System – Information Planning and Consultation (ECOS-IPAC) website, identified small-whorled pogonia, a federally listed threatened orchid, as potentially occurring within the boundaries of the NECEC Project (CMP 2018). In addition to federally listed species, rare plants and rare natural communities, as identified by MNAP, are known to, or have the potential to, occur along the Project route.

1.2 PREVIOUSLY KNOWN OCCURRENCES

Previous surveys along the route identified five rare plant populations and two rare natural communities in Segments 3 and 4. These rare plant populations include a population of dry land

sedge (*Carex siccata)* on the north side of the Androscoggin River (at the north end of Segment 4) and, on Segment 3, a small population of fall fimbry (*Fimbristylis autumnalis*) near the Town of Jay, a small population of wild leek (*Allium tricoccum*) on the south side of the Carrabassett River in Anson, a moderate to large population of red-stemmed gentian (*Gentiana rubricaulis*) in Concord, and a moderate population of long-leaved bluet (*Houstonia longifolia*) at the north end of Segment 3 in Moscow. The two rare natural communities were originally identified as an Enriched Hardwood Forest (Maple-Basswood-Ash Forest) along the Androscoggin River in Livermore Falls and a Hardwood River Terrace Forest (Upper Floodplain Hardwood Forest) along the north side of the Carrabassett River in Anson.

No rare plants or exemplary natural communities were previously identified along Segment 1.

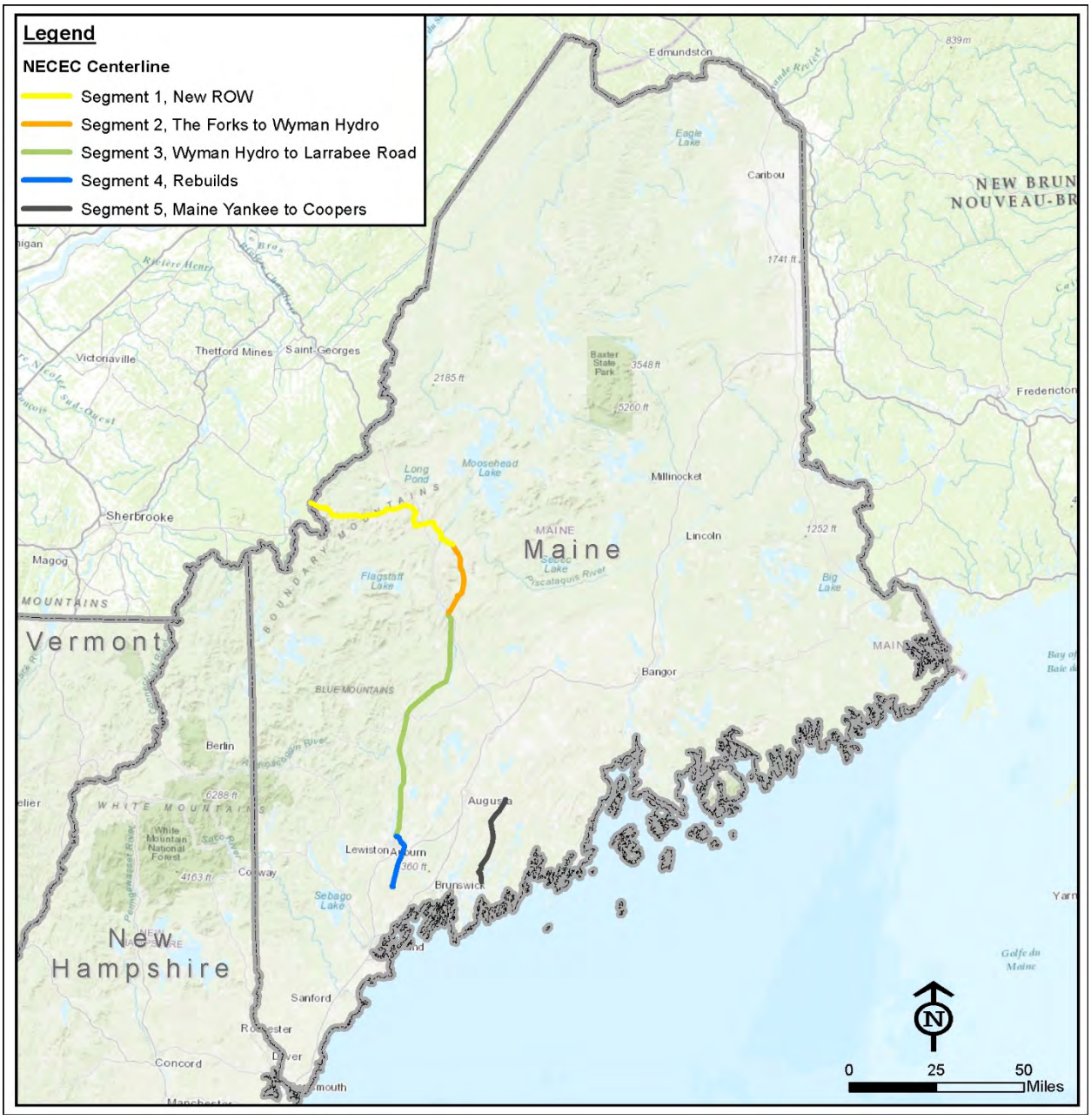


Figure 1. Overview Map of NECEC Project Location and Project Segments

2.0 METHODS

Prior to this work, a desktop Landscape Analysis was conducted by Burns & McDonnell to determine potential locations for rare plant occurrences (CMP 2018). This analysis utilized physical, geographical, and biological information to prioritize search areas. Additional random search areas were identified to account for those areas of the Project not selected as target sample areas. Agency-provided modeling was used in conjunction with the Landscape Analysis on Segment 3, between Jay and Lewiston for small-whorled pogonia surveys (as agreed by MNAP and U.S. Fish and Wildlife Service [USFWS]; CMP 2018). The results of the Landscape Analysis were provided to the plant survey teams, with survey sections ranging from 0.1 mile to 3 miles in length.

2.1 PLANT SURVEY

Surveys for target plant species and rare exemplary natural communities were led by botanists Art Gilman, Duane Choquette, and Mao Lin, each assisted by a field biologist. Plant surveys were conducted during July 2018.

Survey teams searched for plant species that were listed as S1, S2, or S3 by MNAP. These state rankings cover plants that are "rare in Maine" to "critically imperiled in Maine" (See Table 1 for a list of state rankings and their definitions). In addition to state-listed species, the federally listed threatened small-whorled pogonia was actively targeted using a detailed search protocol as described by MNAP (CMP 2018, Appendix E). Two teams surveyed the Project area, one starting from the southern end, the other from the northern end. Surveys for each identified survey area consisted of meander surveys along one side of the ROW and then back down the other side of the ROW, such that surveys ended at the same location they started from.

Table 1. State Rarity Ranks (MNAP)

State Rank	Status
S1	Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
S2	Imperiled in Maine because of rarity (6–20 occurrences or few remaining individual acres) or because of other factors making it vulnerable to further decline.
S3	Rare in Maine (20–100 occurrences),
S4	Apparently secure in Maine.
S5	Demonstrably secure in Maine.
SH	Known historically from the state, not verified in the past 20 years.
SX	Apparently extirpated from the state, loss of last known occurrence has been documented.
SU	Under consideration for assigning rarity status; more information needed on threats or distribution.
S#?	Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

1/ Definitions from the MNAP website (MNAP 2018a)

For areas identified as potential small-whorled pogonia habitat, survey efforts were intensified per the MNAP protocol to account for potential plant and habitat areas. Space between meanders was reduced and teams used walking sticks to move ferns and other vegetation aside to look for potential plants. Where similar woodland whorled-leaved plants existed (i.e. star flower [*Trientalis borealis*], Indian cucumber [*Medeola virginiana*], whorled wood aster [*Oclemena acuminate*], etc.), surveyors walked close enough to positively identify the plants before moving on. Areas with greater potential to contain the plants (Appendix E) were searched more intensively.

2.2 ECOLOGICAL COMMUNITIES

MNAP has classified 104 natural community types across Maine, with each assigned a rarity rank between S1 (rare) and S5 (common). For this survey, rare communities were considered those ranked as S1 through S3. Ranking definitions for communities are the same as those for species (Table 1).

Much of the areas surveyed were in matrix forest lands. In the southern portions of the Project area (Segments 3 and 4), this was dominated by Early Successional Forests and Oak-Pine Forests. The search areas in these segments were within the forested locations and the existing powerline ROW, which is in a managed state of meadow/shrubland condition. In Segment 2, search areas contained more eastern hemlock (*Tsuga canadensis*) and northern white cedar (*Thuja occidentalis*), and some areas were dominated wetlands or by acid fen habitats. Segment 1 included a large amount of cut-over forest land with clear-cuts, pine (*Pinus spp.*), and spruce (*Picea spp.*) plantations, and areas in regeneration, primarily Lower-elevation Spruce – Fir Forest and Spruce-Northern Hardwood Forest.

3.0 RESULTS

The following section summarizes the results and observations from the rare plant species and rare exemplary natural community surveys. A map of the Project location is provided in Appendix A. Maps of all documented rare plant populations and rare natural communities are provided in Appendix B. Photographic documentation is provided in Appendix C and field data are provided in Appendix D. The Landscape Analysis and Field Survey Protocol for small-whorled pogonia is provided in Appendix E.

During the July 2018 rare plant and natural community surveys for CMP, 11 populations of 8 rare plant species, and 6 occurrences of three rare exemplary natural communities were identified (Tables 2 and 3, respectively).

Table 2. Rare Plant Populations Identified During July 2018 Rare Plant Surveys

State Rank	Scientific Species Name	Common Species Name	Number of Populations
S1	*Isotria medeoloides*[1/]	Small-whorled pogonia	1
S1	*Gentiana rubricaulis*	Red-stemmed gentian	2
S2	*Carex siccata*	Dry land sedge	1
S2	*Galium kamtschaticum*	Boreal bedstraw	3
S2	*Dryopteris goldiana*	Goldie's wood fern	1
S2S3	*Houstonia longifolia*	Long-leaved bluet	1
S3	*Trichophorum clintonii*	Clinton's bulrush	1
SH	*Lindernia dubia* var. *anagallidea*	Slender false pimpernel	1

1/ *Isotria medeoloides* is federally listed as "threatened" under the ESA

Table 3. Rare Exemplary Natural Communities Identified During July 2018 Rare Plant Surveys

State Rank	Scientific Community Name	Common Community Name	Number of Occurrences
S1	Jack Pine Forest	Jack Pine Forest	3
S3	Hardwood River Terrace Forest	Upper Floodplain Hardwood Forest	2
S3	Maple-Basswood-Ash Forest	Enriched Northern Hardwood	1

3.1 RARE PLANTS

The rare plant surveys were conducted to identify and document occurrences of plants that were considered rare within the state of Maine, with an S1, S2, or S3 ranking. Only one federal ESA-listed (Threatened) species was known to potentially occur within the Project area: small-whorled pogonia (*Isotria medeoloides*). Another federal ESA-listed (Threatened) orchid, the eastern prairie fringed orchid (*Platanthera leucophaea*), is known from one location in northern Maine. While not anticipated to occur in the survey areas, surveyors were aware and confirmed identifications of other similar-looking species.

Two of the previously identified plant populations were not able to be located during revisit surveys: the wild leek and the fall fimbry. In total, 11 populations of rare species were either newly identified or confirmed along the Project route. A brief description of their occurrences is provided below. Additional information, including photographs and field data is found in the photologs (Appendix C) and field data forms (Appendix D). A summary table of results is provided in Appendix F.

3.1.1 Small-Whorled Pogonia (*Isotria medeoloides*)

Small-whorled pogonia is a long-lived, perennial orchid, having an appearance similar to Indian cucumber, with a fleshy, glabrous stem, approximately 10 to 15 inches tall and, typically 5 (though may also be 4 or 6) elliptical leaves arranged in a pseudo whorl at the top of the stem. Flowering individuals have a single (rarely two) pale, greenish-yellow flower on a very short stalk arising from the center of the leaf whorl. It occurs in mid-successional forests, often with little groundcover, and often in areas near small seasonal streams on soil with a hardpan layer. It is ranked S1 and has been documented in five counties in Maine: Androscoggin, Cumberland, Kennebec, Oxford, and York (MNAP 2018b). Small-whorled pogonia is federally listed as threatened under the federal ESA.

Small-whorled pogonia
Photo Credit: Ritchie 2018

A single non-flowering, but quite robust individual was identified within a total of 8 miles of targeted search areas. The occurrence was located west of the south end of Allen Pond, in Greene, ME (Appendix B, Sheet-12); just west of the proposed Project clearing limits (approximately 12 feet from the boundary, as identified by GPS). The plant was growing on a relatively steep northeast-facing embankment of a small intermittent stream within an Oak-Pine Forest community; the most closely associated trees were hemlock and red oak (*Quercus rubra*), with yellow birch (*Betula alleghaniensis*) and red maple (*Acer rubrum*) present to a lesser extent. There was no groundcover vegetation within 2 feet of the plant and the ground was covered with a moderately thick layer of deciduous and conifer leaf and twig/branchlet litter. This location is approximately 80 feet from the existing powerline ROW clearing.

3.1.2 Red-Stemmed Gentian (*Gentiana rubricaulis)*

Red-stemmed gentian is a wetland plant more commonly found around the Great Lakes, where it inhabits natural prairie habitats. It is known in the northeast from New Brunswick, Canada, and two counties in Maine: Kennebec and Somerset (MNAP 2018b).

Red-stemmed gentian

Photo credit: Ritchie 2018

Two populations were identified in the Project Area. Both populations were only in-leaf, as the species flowers in August and September; later than the search effort. One population was a previously identified population in Segment 3, in Concord, near Bingham, ME (Appendix B, Sheet-9). This population was entirely within the existing cleared powerline ROW, with some plants near the edge of the forest clearing. Its estimated population size was 150 individuals. The second population was a new population, identified in Segment 2, near Moscow, ME (Appendix B, Sheet-7). Both populations are in Somerset County and found within the existing ROW clearing. However, the second population was present both along the edges of a shallow wetland and into the forest edge of a young northern white cedar swamp. The estimated population size was approximately 300 individuals. In both location, plants appeared to prefer the damp margins of the wetlands and adjacent uplands, rather than areas that may be seasonally inundated in the wetland centers, and tended to grow where herb cover was not greater than 2 feet in height.

Plants were not in flower and were identified by their distinctive vegetative characteristics (e.g., semi-clasping, opposite leaves and smooth glabrous stems); plants at the Concord site were observed in flower in 2007 by Gilman. Both populations consist of randomly rather sparsely scattered individuals. In this species, plants are biennial and typically form single stems, with some few plants having two to four stems. Non-flowering, first-year seedlings are no doubt present but could not be identified or counted, due to lack of identifying characteristics and visibility; the overall population therefore probably is twice the estimate given.

3.1.3 Dry Land Sedge (*Carex siccata*)

This species is generally found in dry sandy soils in open to lightly shaded areas. Dryland sedge is an erect, clonal (patch-forming) sedge with both clump and single stem growth habits, generally between 15 and 20 cm tall. In Maine, it has been found in dry, old fields in early stages of succession (MNAP 2018b). It is documented in six counties in Maine: Androscoggin, Cumberland, Oxford, Sagadahoc, and York.

The Lewiston population was a previously identified in 2007, at the northern end of Segment 4. The location is at the edge of a corn field, between the margin of cultivation and the Androscoggin River (Appendix B, Sheet-13). The population exists wholly within the existing powerline ROW, and consists of two distinct groupings along the river terrace. The individuals were in leaf and fruiting reproductive stages, but were moderately suppressed due to competition with other herbaceous plants and some shrubs.

Dry-land sedge
Photo credit: Ritchie 2018

3.1.4 Boreal Bedstraw *(Galium kamtschaticum)*

Boreal bedstraw is perennial herb found in cool woods, thickets and along streambanks and is known to occur in rich woods in Maine. It is considered rare in Maine as it is at the southern extent of its range. Boreal bedstraw has been documented in four counties in Maine: Franklin, Piscataquis, Oxford, and Somerset (MNAP 2018b)

The plant was identified in three distinct populations at the northern extent of the Project areas, in Segment 1 (Appendix B, Sheet-1). The populations ranged from large to small in size, all found within the Appleton Township in Somerset County. The populations were situated on the northern slope of Tumbledown Mountain between 2,200 and 2,300 feet in elevation. All three populations were found on old logging roads in northern hardwood forests that have previously undergone timber harvest. The

Boreal bedstraw
Photo credit: Choquette 2018

current regenerating forest structure consisted of sugar maple (*Acer saccharum*) dominant canopy with trees ranging from 6 to 12 inches in diameter.

The easternmost population was located within a small forested wetland on an overgrown logging road. The plants were found growing on the edge of a moose trail, intermixed with common jewelweed (*Impatiens capensis*), enchanter's nightshade (*Circaea lutetiana*), and marsh bedstraw (*Galium palustre*). This large population contained over 500 individual plants, all with a vigorous growth habit and displaying flowers and fruit.

The other two populations were separated by approximately 25 feet and located at the intersection of two logging roads where a hillside seep provides hydrology to the old road bed, resulting in a small forested wetland community. A logging clear-cut within the early stages of regeneration was located less than 50 feet to the west of these populations. The wetland is wetter than the previous location, and supports a dense herbaceous sedge community, with the boreal bedstraw found amongst gaps in the sedges along with jewelweed and interrupted fern (*Osmunda claytoniana*). These two populations combined were smaller than the easternmost population with 16 and 85 individuals respectively. These populations also displayed vigorous growth habit along with flowers and fruit.

3.1.5 Goldie's Wood Fern (*Dryopteris goldiana*)

Goldie's wood fern is a large wood fern, generally found in enriched moist woodland habitats, usually in hilly or mountainous terrain. It is found from southeastern Canada, south to the Carolinas and west to Minnesota. Diagnostic features include circular sori (spore-producing regions on fertile fronds) that are located along the mid-vein of each secondary leaflet (pinnule), narrow dark scales at the base of each stalk, and fronds that are parallel-sided and narrow abruptly at the tip. This species is documented in seven counties in Maine; Aroostook, Franklin, Kennebec, Oxford, Penobscot, Piscataquis, Somerset.

Goldie's fern
Photo credit: Ritchie 2018

A single plant with six crowns was identified on Segment 2 in Moscow in Somerset County (Appendix B, Sheet-5). This small population was located in an enriched inclusion of wetland in otherwise upland deciduous forest, along a former logging road/drainage. This wetland/enriched forest habitat has a dark, organic loamy soil and included wetland species such as common jewelweed and sensitive fern (*Onoclea sensibilis*). Yellow birch was common immediately around the location where the Goldie's wood fern was found. This area was parallel to the open habitat of the existing powerline ROW and is quite small and limited to this one drainage-way; there appears to be no other suitable habitat nearby.

3.1.6 Long-leaved Bluet (*Houstonia longifolia*)

Long-leaved bluet is a small herbaceous perennial plant with a small, four-petaled, white flower. It can be found on rocky ledges or river shore gravels that are not strongly acidic, and is usually found growing in small ledge crevices or depressions. Maine populations tend to be small but persistent. The plant is documented in six counties: Cumberland, Kennebec, Penobscot, Piscataquis, Sagadahoc, and Somerset (MNAP 2018b). It is rare in Maine due to being at the northern limit of its range

Long-leaved bluet
Photo credit: Ritchie 2018

This population was previously identified during a survey in 2008. It is located on an elevated river terrace, just downstream from Wyman Dam (Appendix B, Sheet-8). The population is dispersed across a relatively large, semi-bare gravel area within the existing powerline ROW clearing. The population is of moderate size and vigor. The survey botanist indicated that the population was substantially reduced from previous visits, finding only one patch of plants with the high vigor previously observed. Plants were in leaf and flower at the time of the survey. Lichens appeared to be the dominant competing groundcover.

3.1.7 Clinton's Bulrush (*Trichophorum clintonii)*

Clinton's bulrush is a relatively low-growing sedge with solitary terminal spikelets. It can be found growing in diverse conditions; from dry or springy ledges, gravel or open woods and turfy shores. In Maine, it has been found growing on calcareous ledgy shores (MNAP 2018b) and has been documented from five counties: Aroostook, Kennebec, Penobscot, Piscataquis, and Somerset. It is considered rare in Maine as it is at the southern limit of its range.

Clinton's bulrush
Photo credit: Gilman 2018

A small population was identified approximately 0.1-mile upslope from an actively eroding Chase Stream (Appendix B, Sheet-6). The erosion was significant, resulting in very high mobile banks. This population was found within the existing powerline ROW clearing, mostly growing underneath a stand of bracken fern (*Pteridum spp.*), and co-occurring with bunchberry dogwood (*Cornus canadensis*). Some clumps were also found growing within the sandy ROW access road.

3.1.8 Slender False Pimpernel *(Lindernia dubia* var*. anagallidea)*

Although the species *Lindernia dubia* is common in Maine, this variety, *anagallidea*, was historically only identified in one location in Maine; a damp, abandoned gravel pit in York County (MNAP 2018b). This annual herbaceous plant is generally found in open wet areas, though not along the coast or rivers, and can include old fields and roadsides (MNAP 2018b). Its distribution ranges from Florida to Maine, and westward to Washington State. It's considered rare in Maine, due to being at the northern limit of its range.

Lindernia dubia var. anagallidea
Photo credit: Gilman 2018

A small, very limited population of the slender false pimpernel was identified near the town of Jay, ME (Appendix B, Sheet-14). It was observed near an abandoned gravel pit along the existing powerline ROW. The available habitat was extremely limited; within a small, shallowly puddled area on the floor of the former gravel pit, surrounded by sparsely vegetated, level, dry, gravelly terrain. The population was small, consisting of 15 to 20 small individuals of less than normal vigor. Plants were in different stages of maturity; from in-leaf to mature fruit and seed dispersing. Associated plant species include poverty rush (*Juncus tenuis*) and slender false foxglove (*Agalinis tenuifolia*).

3.2 NATURAL COMMUNITIES

The MNAP designates rare natural community types within the state of Maine. Two rare natural communities were identified during previous surveys of part of the route. During revisits, these communities were re-assessed. A previously identified Enriched Northern Hardwood Forest, was reclassified as a Hardwood River Terrace Forest, after resurveys. A total of six occurrences of three rare exemplary natural community types were identified during the 2018 surveys; three Jack Pine Forests, two Hardwood River Terrace Forests, and one Enriched Northern Hardwood Forest. Below, is presented a brief description of each identified rare natural community. Additional information is provided in the photologs (Appendix C) and field data forms (Appendix D).

3.2.1 Jack Pine Forest

Jack Pine Forest – Bradstreet Township
Photo credit: Choquette 2018

The MNAP (2018c) describes a Jack Pine Forest as a closed canopy forest dominated by jack pine (*Pinus banksiana*). Black spruce (*Picea mariana*) or red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*) are common, comprising up to 20 percent cover, and red pine (*Pinus resinosa*) may be present in some areas as well. Although plants in the understory and herbaceous layers are limited, and the bryoid layer is well developed, lowbush blueberry (*Vaccinium angustifolium*) and herbs such as bunchberry and Canada mayflower (*Maianthemum canadense*) are typically present. In Maine, disturbance such as clear-cuts or fire are needed to stimulate seed germination, Jack Pine Forests. Without disturbance these forests would eventually succeed to spruce and fir (MNAP 2018c).

This natural community was identified in three distinct forest stands at the northern extent of the Project areas in Segment 1, all found within the Bradstreet Township in Somerset County.

Two of the Jack Pine Forest stands were located in the same general area northwest of Egg Pond, and east of Bitter Brook. The two stands were separated by a regenerating logging cut, and were likely one contiguous community prior to the logging activities (Appendix B, Sheet-2). The stands abutted regenerating clear-cuts to the north, east and west, which were dominated by young red spruce, though scattered young jack pines were found throughout. Both Jack Pine Forest stands extended southward outside of the study corridor, where they transitioned into a black spruce bog community. These two Jack Pine Forest stands were predominately jack pine (90 percent dominant), with mixed white pine (*Pinus strobus*), red pine and red spruce in the canopy. The understory was dry and open, with lowbush blueberries, laurels (*Laurus spp.*), and snowberries (*Symphoricarpos spp*.) found sporadically in patches, and bracken fern present in areas where the canopy thins. Soils were shallow and rocky, with a thin organic layer on top of a sandy mineral soil.

The third Jack Pine Forest stand was located on triangular swath of habitat bounded on the southern side by a spruce/fir forest bordering Spencer Road, the northwestern side by Horse Brook and on the northeastern side by an unnamed tributary of Horse Brook (Appendix B, Sheet-3). The Jack Pine Forest is fairly large, extending outside of the survey area to the north. The south side abutted a mixed spruce and fir forest. Sugar maples saplings appear sporadically in the understory in the western edge of the Jack Pine Forest near Horse Brook. The Jack Pine Forest also spans a large alder-dominant stream valley and two smaller wetland seeps. This Jack Pine Forest stand was predominately jack pine (70 percent dominant), with mixed red pine, red spruce, and balsam fir in

the canopy. The understory is dry and open, with bracken fern and bunchberry found throughout. Soils were deep and sandy with a thin organic layer on top.

3.2.2 Hardwood River Terrace Forest

Hardwood River Terrace Forest communities occur on slightly elevated terraces of low-gradient rivers, with occasional flooding. Soils are fine sand or silt and of relatively high nutrient levels. The canopy is almost complete, and dominated by sugar maple, red oak, or yellow birch. The understory is generally open with few shrubs, and a lush herb layer is usually present (including spring ephemerals) with few mosses. (MNAP 2018c).

Hardwood River Terrace Forest – Livermore Falls
Photo credit: Gilman 2018

Two communities of this type were observed during the July 2018 surveys, one near Livermore Falls, ME, along the Androscoggin River (Appendix B, Sheet-11), and the other along the Carrabassett River near North Anson (Appendix B, Sheet-10).

The community along the Androscoggin River, near Livermore Falls, was a small patch community within a large floodplain forest community. This small patch was distinctive in the size and make-up of the overstory vegetation; consisting of red oak, swamp birch (*Betula pumila*), red maple, and at least one butternut (*Juglans cinerea*), and conspicuously lacking silver maple (*Acer saccharinum*) or cottonwoods (*Populus spp*.). The understory was generally sparse, and the herbaceous layer was dominated by ferns, such as ostrich fern (*Matteuccia struthiopteris*), interrupted fern, lady fern (*Athyrium filix-femina*), and sensitive fern.

The community observed in North Anson was on the north side of the Carrabassett River at a site near its confluence with the Kennebec River and would rarely be subject to back-flooding from the River. This community is a patch on uneven terrain (i.e., old back-channels combined with gently sloping land), that lies between a narrow strip of silver maples (at the stream margin) and cultivated lands. The forest community is of relatively young age (many trees less than 10 inches in diameter) and is dominated by green ash (*Fraxinus pennsylvanica*), red oak, and American elm (*Ulmus americana*). There is an understory (increasing since first observed in 2007) of non-native shrubs, such as Asian honeysuckles (*Lonicera spp*.) and multiflora rose (*Rosa multiflora*). No plant species indicative of particularly enriched soil conditions were observed (e.g., no wild leek, northern maidenhair fern [*Adiantum pedatum*], etc.), and forest health appears somewhat compromised.

3.2.3 Enriched Northern Hardwood Forest

Enriched Northern Hardwood Forest – Moxie Road
Photo credit: Ritchie 2018

Enriched Northern Hardwood Forests occur throughout much of Maine. They are often small patches, occurring within larger matrix northern hardwood forests. They are closed-canopy hardwood forests, often dominated by sugar maple, with beech (*Fagus grandifolia*) or yellow birch subordinate. The understory vegetation is generally lacking, being mostly made up of saplings of the canopy trees. Ironwood (*Carpinus caroliniana*), basswood (*Tilia americana*), and ash (*Fraxinus spp.*) are generally present, though basswood may be absent in northern Maine (MNAP 2018c). Herbaceous plants that are indicative of this community include northern maidenhair fern, silvery spleenwort (*Desparia acrostichoides*), blue cohosh (*Caulophyllum thalictroides*), Christmas fern (*Polystichum acrostichoides*), Dutchman's breeches (*Dicentra cucullaria*), etc. These communities occur on concave hillsides, ravines, stream drainages, or slope bases where nutrients accumulate, with slopes ranging from moderate to flat.

The Enriched Northern Hardwood Forest identified during the surveys occurs on a gentle north-facing slope, south of Moxie Stream, in Somerset County, ME (Appendix B, Sheet-4). This forest community is dominated by sugar maple with a strong ash and yellow birch component. Ironwood and elm were present as well as the occasional basswood. Temporary drainages threaded throughout the site, with visible flow-paths present, but no dedicated streambanks. The soils ranged from a rich silty loam to sandy loam. Northern maidenhair fern was prevalent within the community, forming distinct patches. Silvery spleenwort was also common throughout the site. Other herbaceous plants occurring in this community are Christmas fern, common jewelweed (in wetter areas), dwarf enchanter's nightshade (*Circaea alpine*), baneberry (*Actaea pachypoda, Actaea racemose*), sarsaparilla (*Aralia nudicaulis*), and ostrich fern, among others.

Evidence of past harvest was present in the form of decaying stumps. Trees ranged from sapling to mature, though trees rarely exceeded 2 feet in diameter. Many young saplings made up the majority of the understory.

4.0 DISCUSSION

Three types of targeted surveys for rare plants and rare exemplary natural communities were conducted in the Project area:

- Revisit surveys of previously identified occurrences were conducted within Segment 4 and most of Segment 3;
- Targeted surveys for the small-whorled pogonia were conducted in areas where models had predicted suitable habitat characteristics in Segment 3; and,
- Standard meander surveys were conducted for identification of any rare plants or rare communities for the remainder of Segment 3, and all of Segments 2 and 1.

4.1 REVISIT SURVEYS OF PREVIOUSLY KNOWN OCCURRENCES

Surveys were conducted in 2007 along parts of the Project area for Segments 4 and 3. These surveys identified five rare plant populations, and two rare communities. Only three of the five rare plant populations were identifiable during the July 2018 surveys. Two species were not encountered in previously identified areas: wild leek and autumn fimbry. The wild leek population previously on the south side of Carrabassett River was not relocated in the current effort. A grid search was executed in late July, by which time flowering stems are normally visible, by the surveyor (Gilman) who previously identified this small population (10 stems), within the polygon previously mapped as containing the species. The population of fall fimbry had previously been identified near an active gravel pit, but was not relocated. Two visits were made to this location in an attempt to relocate the population, but these searches were unsuccessful. This species is an annual, and given the nature of the site and the small size of the original population, it may simply have not persisted.

The three plant population that were re-located were red-stemmed gentian, long-leaved bluets, and dryland sedge. Although the flowers are not in blossom in July, the gentian plants were distinct in their vegetation form along the wetland edge near their previously documented location. The plants were generally of good vigor and scattered throughout the wetland. Surveyors were able to document additional occurrences of plants within this population from what was previously known. This included plants growing up near the edge of the existing powerline ROW clearing, in more upland-like habitats.

The population of long-leaved bluet was observed by the lead surveyor (Gilman), who had previously conducted the rare plant surveys, to have much reduced in vigor and number of individuals from what was previously documented. Plants were generally scattered across the gravel area where they were previously found, however clumps were more dispersed than previously documented, with only one patch at the strong vigor remembered from 2008. It appears that, as growth of lichens, mosses, and vascular plants has continued over time, the habitat for the disturbance-adapted bluets has become too stabilized for recruitment. A seed-bank is likely present throughout so that, if disturbances should occur, the population may increase again. Plants were in flower and leaf during the July field survey.

The dry-land sedge population was of similar vigor and extent as previously documented, however the lead surveyor (Gilman), who had previously conducted the rare plant surveys, noted the ramets were more suppressed than previously documented and indicated competition from other herbs and shrubs. A few areas of the population had plants that were not suppressed. Plants were in fruit and flower.

The previously identified rare natural communities were both different from what was observed a decade ago. The area previously identified as an Enriched Northern Hardwood Forest along the Androscoggin River, was revised to a Hardwood River Terrace Forest, upon more detailed investigation. No basswood trees were found during this survey, although butternut was present. There was a notable lack of silver maple or cottonwood trees.

The Hardwood River Terrace Forest along the Carrabassett River was much more invaded by invasive honeysuckle (approximately 40 to 50 percent cover), which is substantially more than was observed in 2007.

4.2 TARGETED SMALL-WHORLED POGONIA SURVEYS

Landscape analysis models were used to predict potential occurrences of the federally listed threatened small-whorled pogonia (Appendix E). Surveyors performed targeted detailed searches within these search areas. The general forest communities consisted of sparse overstory and relatively closed forest canopy. It should be noted that the model sometimes included open ROW habitat, covered in juniper, and other open habitats. These habitats are unsuitable for small-whorled pogonia, therefore, surveys focused on the forested habitats, though a walk-through was also conducted through the open ROW, where the model indicated potential occurrence.

One occurrence of small-whorled pogonia was documented, as described above, within an Oak-Pine Forest. This occurrence consisted of one individual growing on the north side of a stream embankment in a dense canopy forest with very little understory or groundcover. An intensive search to the end of the Project area limits and north and south along the existing powerline ROW was conducted and no other individuals were identified in the area. The plant was located just west of the proposed clearing limits (10 to 12 feet, according to GPS).

4.3 NEW OCCURRENCES

Few populations of rare plants were recorded along the majority of the proposed route. Much of the proposed area is either in typical matrix habitat or previously disturbed due to logging, plantations, or transmission line activities. Evidence of past settlement was also present in many areas, such as stone walls, orchard vegetation, and old roads. The northern habitats were dominated by forests in regeneration after clear-cut logging. More intensive surveys were conducted in habitats with higher potential to contain rare species, while recently disturbed cutover areas and areas in dense regeneration received a less-intense survey effort. New documented populations were generally small, with the exception of one boreal bedstraw population and the newly identified red-stemmed gentian population.

5.0 REFERENCES

CMP (Central Main Power). 2018. New England Clean Energy Connect (NECEC) Project. Rare Plant and Exemplary Natural Community Landscape Analysis and Field Survey Protocol.

MNAP (Maine Natural Areas Program). 2018a. Maine Natural Areas Program – State and Global Rarity Ranks. Maine Department of Agriculture, Conservation and Forestry. Accessed (August 2018) from the website: https://www.maine.gov/dacf/mnap/features/rank.htm

MNAP. 2018b. Maine Natural Areas Program – Maine Rare Plant List and Rare Plant Fact Sheets. Maine Department of Agriculture, Conservation and Forestry. Species fact sheets (accessed August 2018) from the website: https://www.maine.gov/dacf/mnap/features/rare_plants/plantlist.htm

MNAP. 2018c. Maine Natural Areas Program – Natural Community Fact Sheets. Maine Department of Agriculture, Conservation and Forestry. Community fact sheets (accessed August 2018) from the website: https://www.maine.gov/dacf/mnap/features/commsheets.htm

APPENDIX A

Overview Map of Project Area and Plant Locations

70°W

Sheet 2
Sheet 3
JackPineWood004DMC
JackPineWood006DMC
Sheet 1
GALKAM002DMC
GALKAM003DMC
GALKAM001DMC
EA03AR
Sheet 4
Sheet 7
Sheet 5
GERU04AR
Sheet 6
HOLO01AR
Sheet 8
GERU01AR
TRCL01AR
GERU02AR
Sheet 9
Hardwood River Terrace Forest
Sheet 10
LIDU01AG
Sheet 14
EA01AR
Sheet 11
ISME01AR
Sheet 12
CASI02AR
Sheet 13
CASI01AR

MEGANTIC MOUNTAIN
BLUE MOUNTAINS
BOUNDARY MOUNTAINS
WHITE MOUNTAINS
SANDWICH RANGE
UNITED STATES
CANADA

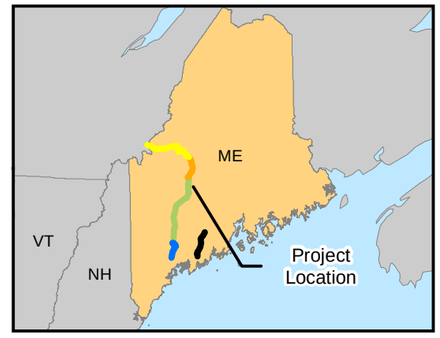
70°W

Legend

- Natural Community
- Rare Plant

NECEC Centerline

- Segment 1, New ROW
- Segment 2, The Forks to Wyman Hydro
- Segment 3, Wyman Hydro to Larrabee Road
- Segment 4, Rebuilds
- Segment 5, Maine Yankee to Coopers



N

0 4 8 16 24 Miles

Rare Plant Survey Overview
July 2018

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 7/2018

Source: Esri, et. al., 2014; CMP 2018

Coordinate System: North American Datum, 1983 Universal Transverse Mercator, Zone 19 North

APPENDIX B

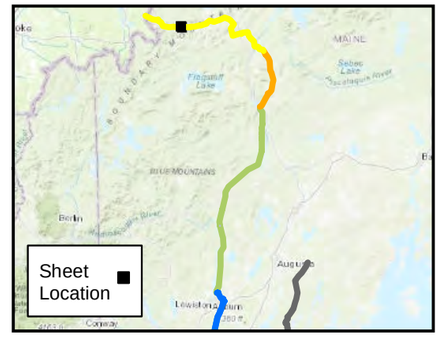
Maps of Documented Rare Plant Populations and Rare Natural Communities

Legend

- Rare Plant
- Survey Areas
- NECEC Project
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 1, New ROW



N

0 30 60 120 Feet

Rare Plant Survey Results - July 2018

Sheet 1 -
Galium kamtschaticum

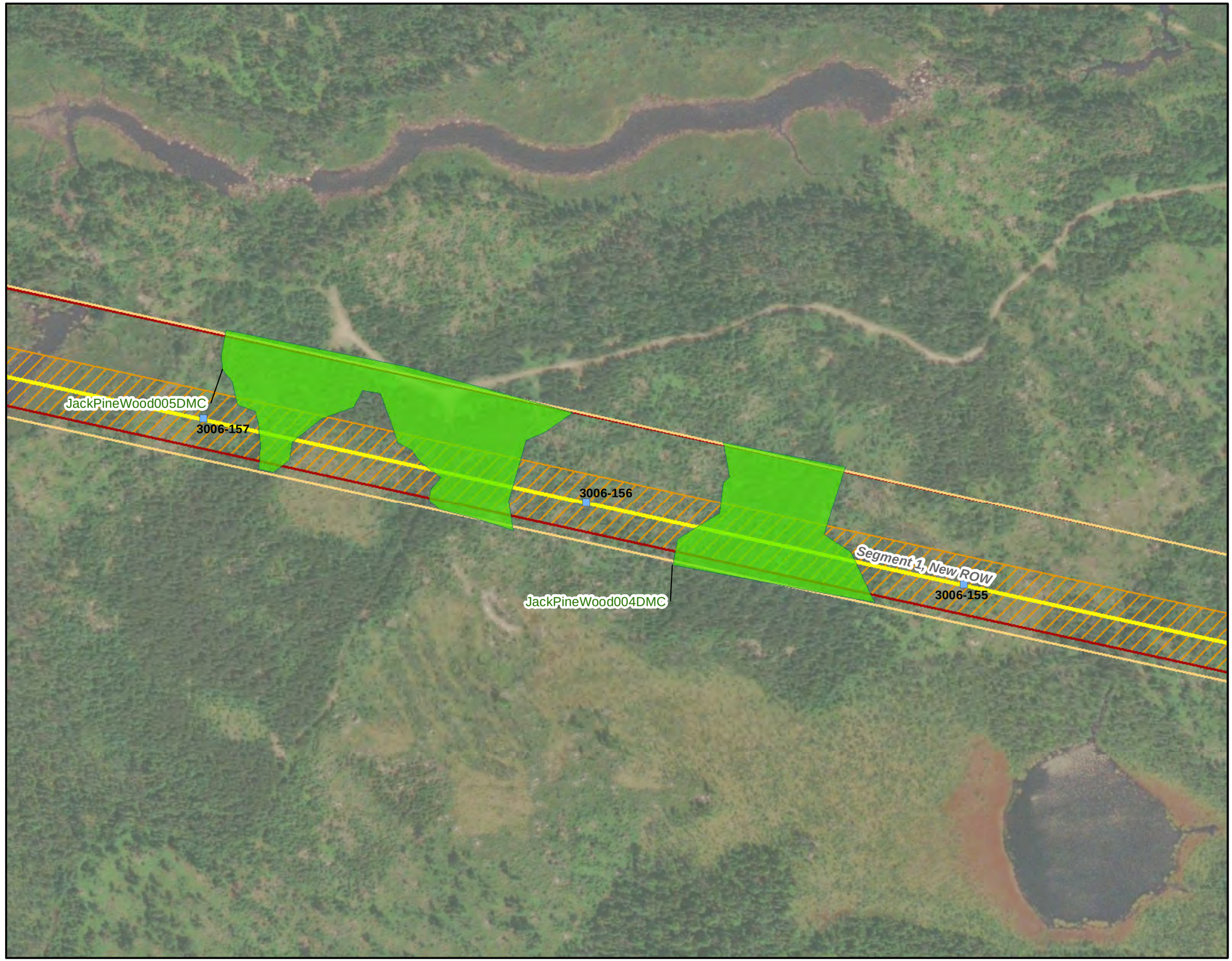
Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

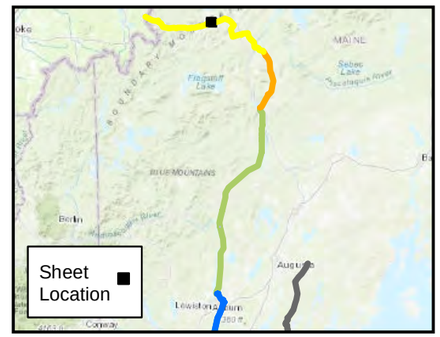


Legend

- Natural Community
- Survey Areas
- NECEC Project Area
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 1, New ROW



Rare Plant Survey Results - July 2018

Sheet 2 -
Jack Pine Forest

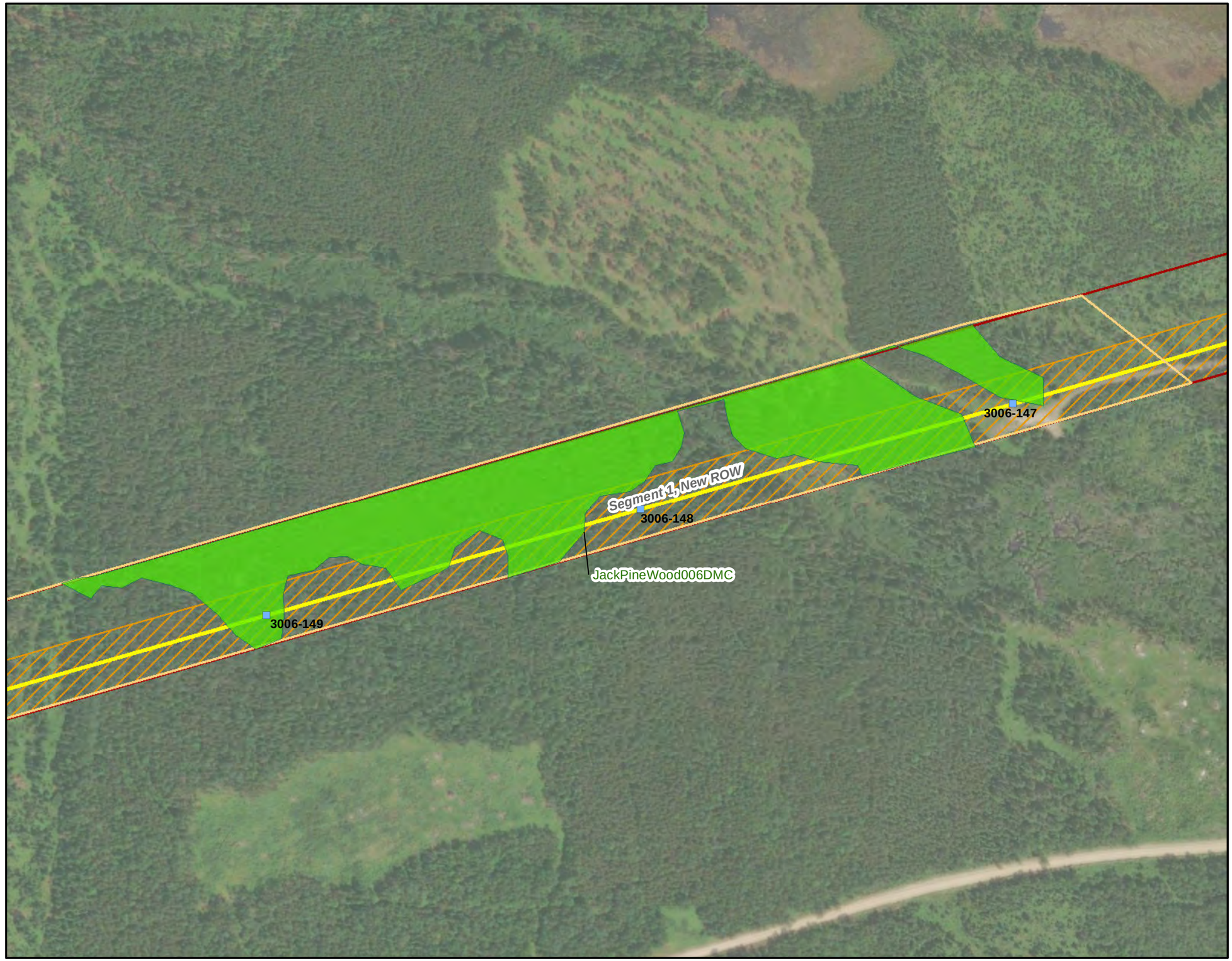
Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

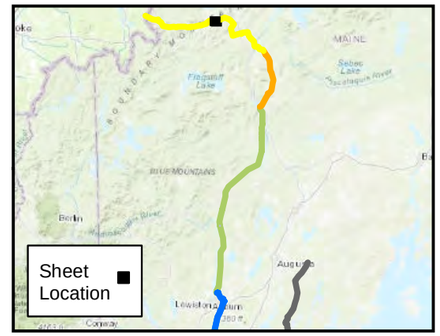


Legend

- Natural Community
- Survey Areas
- NECEC Project Area
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 1, New ROW



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 3 -
Jack Pine Forest

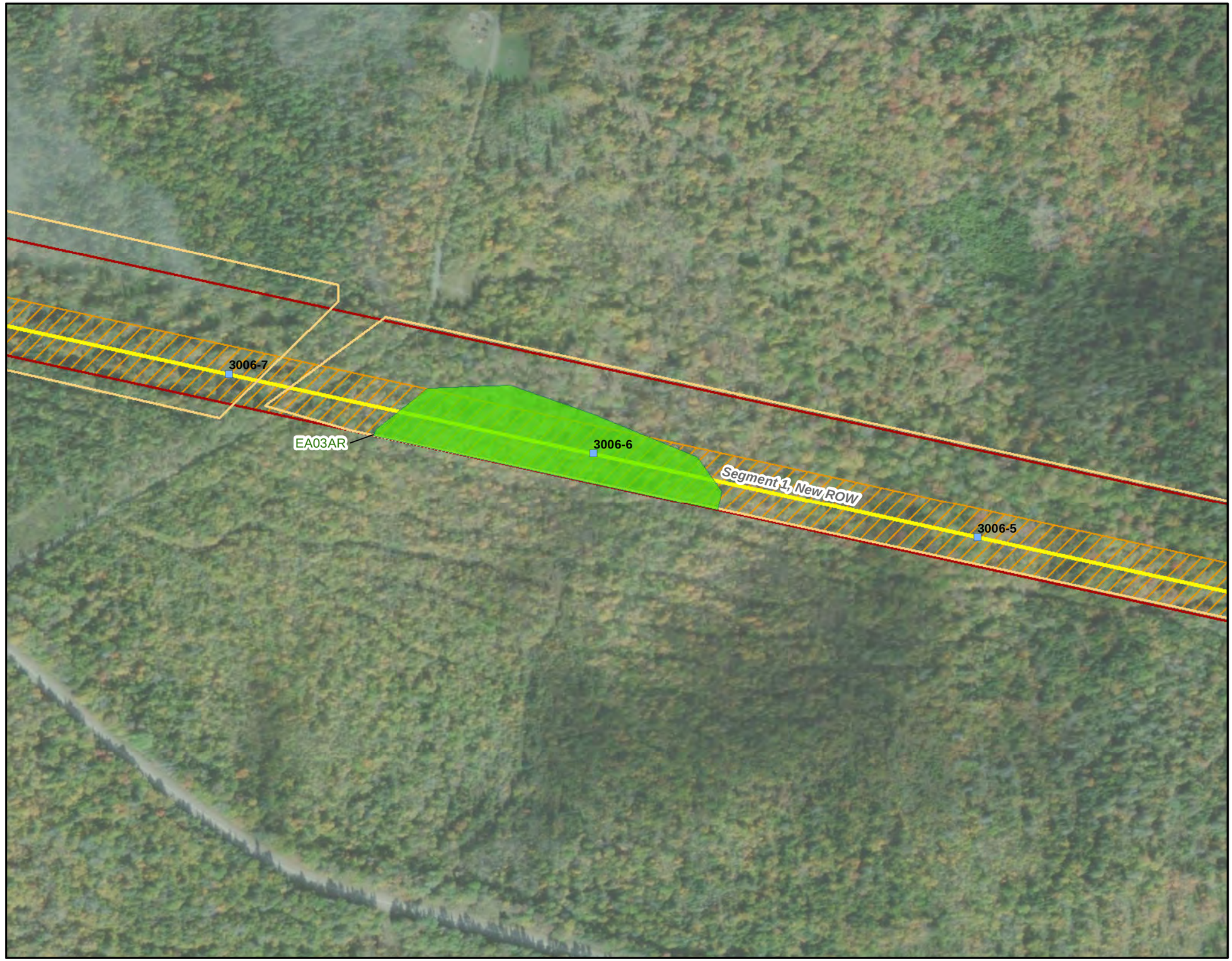
Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

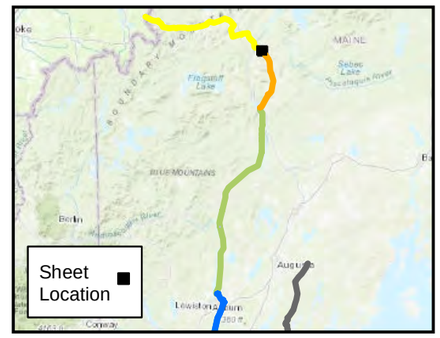


Legend

- Natural Community
- Survey Areas
- NECEC Project Area
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 1, New ROW



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 4 -
Enriched Northern Hardwood Forest

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

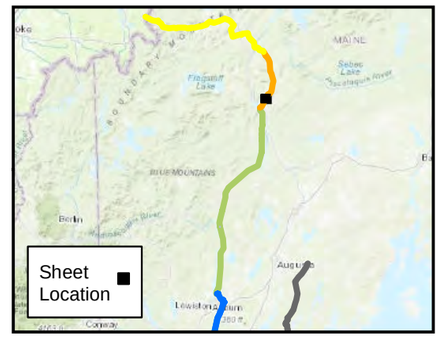
Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

Legend

- Rare Plant
- Survey Areas
- NECEC Project Area
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 2, The Forks to Wyman Hydro



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 5 -
Dryopteris goldiana

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

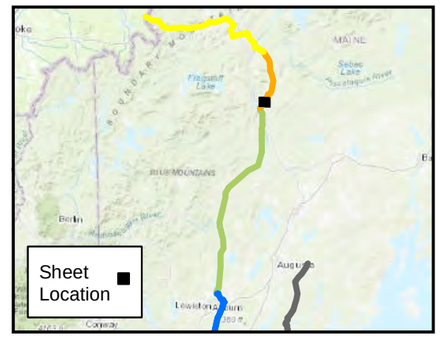
Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

Legend

- Rare Plant
- Survey Areas
- NECEC Project Area
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 2, The Forks to Wyman Hydro



N

0 40 80 160 Feet

Rare Plant Survey Results - July 2018

Sheet 6 -
Trichophorum clintonii

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

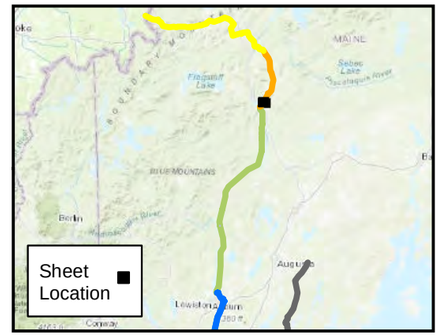
Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

Legend

- Rare Plant
- Survey Areas
- NECEC Project Area
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 2, The Forks to Wyman Hydro



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 7 -
Gentiana rubricaulis

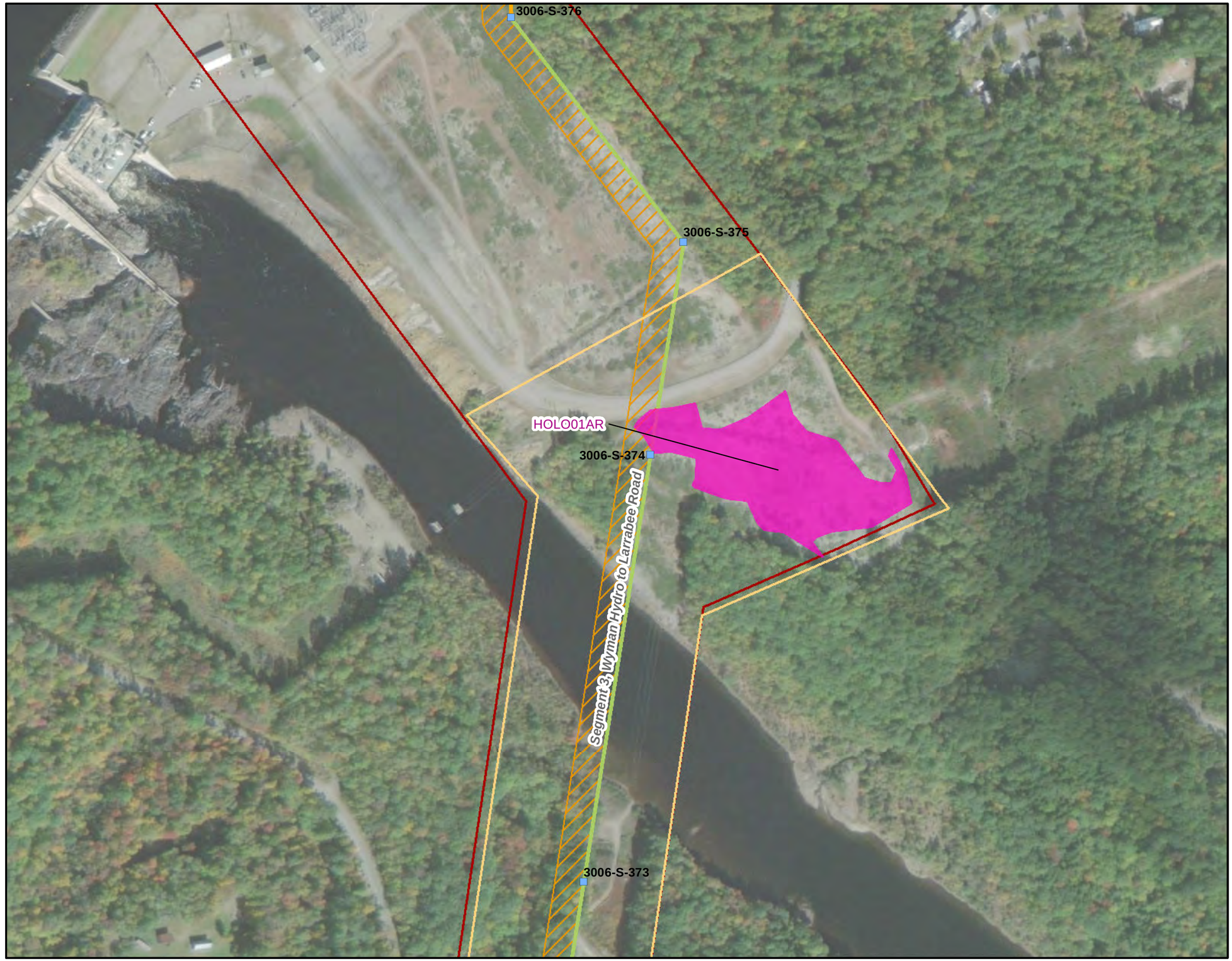
Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

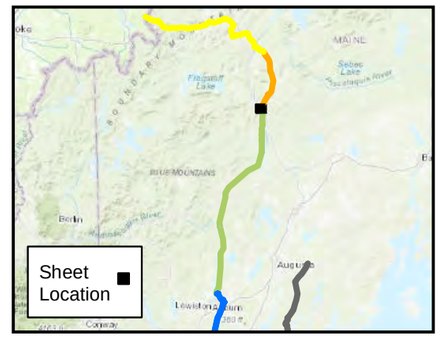


Legend

- Rare Plant
- Survey Areas
- NECEC Project Area
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 2, The Forks to Wyman Hydro
- Segment 3, Wyman Hydro to Larrabee Road



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 8 -
Houstonia longifolia

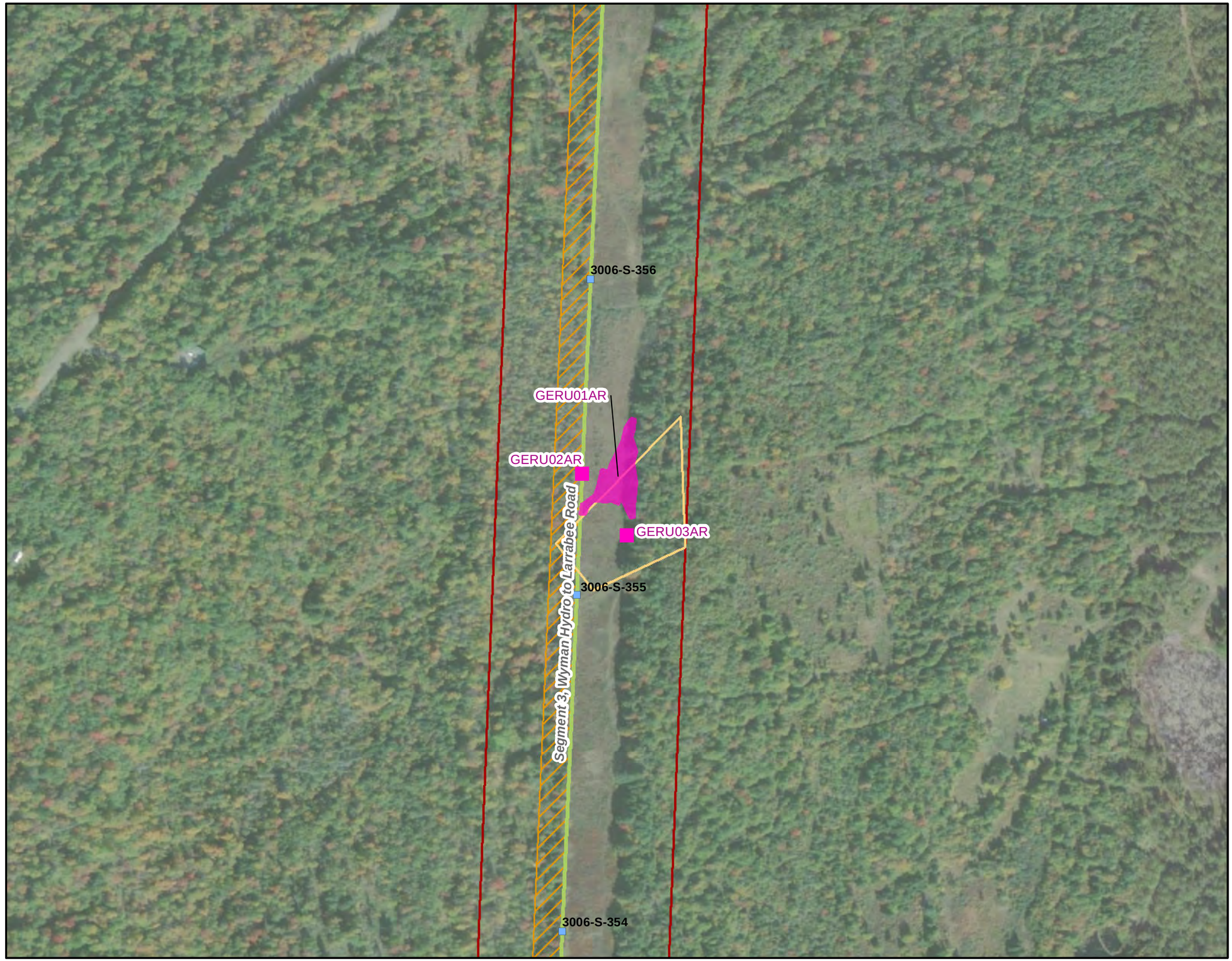
Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

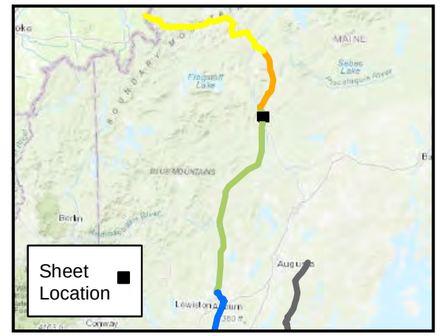


Legend

- Rare Plant
- Survey Areas
- NECEC Project
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 3, Wyman Hydro to Larrabee Road



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 9 -
Gentiana rubricaulis

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

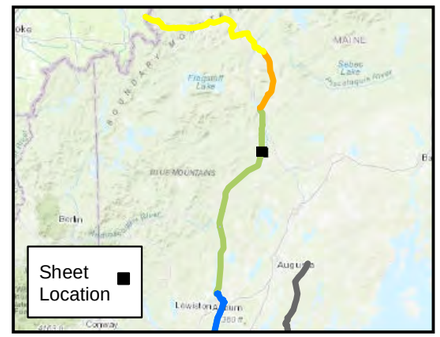
Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

Legend

- Natural Community
- Survey Areas
- NECEC Project
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 3, Wyman Hydro to Larrabee Road



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 10 -
Hardwood River Terrace Forest

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

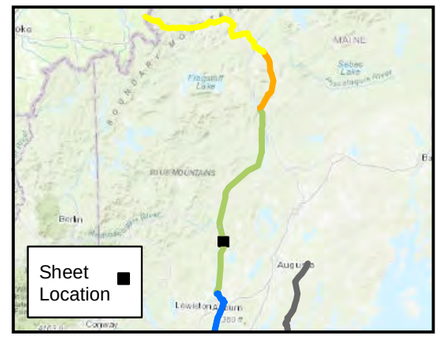
Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

Legend

- Natural Community
- Survey Areas
- NECEC Project
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 3, Wyman Hydro to Larrabee Road



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 11 -
Enriched Northern Hardwood Forest

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

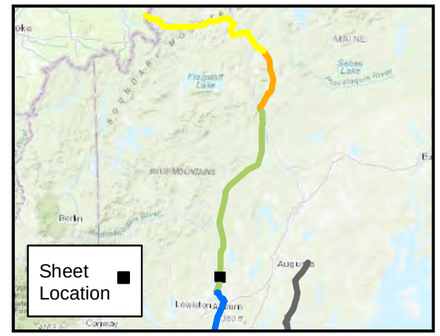
Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

Legend

- Rare Plant
- Survey Areas
- *Isotria medeoloides* Search Area
- NECEC Project
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 3, Wyman Hydro to Larrabee Road



N

0 125 250 500 Feet

Rare Plant Survey Results - July 2018

Sheet 12 -
Isotria medeoloides

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

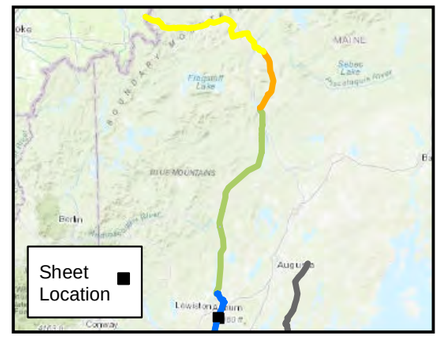
Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

Legend

- Rare Plant
- Survey Areas
- NECEC Project
- NECEC Proposed Structures

NECEC Centerline

- Segment 4, Rebuilds



Rare Plant Survey Results - July 2018

Sheet 13 -
Carex siccata

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

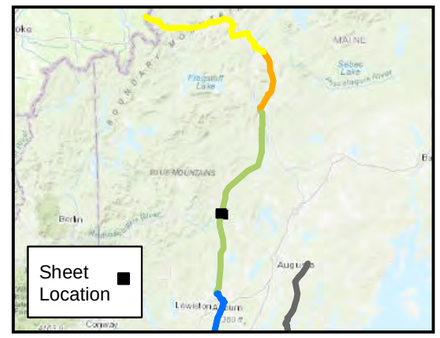
Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

Legend

- Rare Plant
- Survey Areas
- NECEC Project Area
- NECEC Clearing Limits
- NECEC Proposed Structures

NECEC Centerline

- Segment 3, Wyman Hydro to Larrabee Road



N

0 40 80 160 Feet

Rare Plant Survey Results - July 2018

Sheet 14 -
Lindernia dubia var. anagallidea

Prepared For: CENTRAL MAINE POWER

Prepared By: TETRA TECH

Date: 07/2018

Source: Esri, et. al., 2014, CMP 2018

Coordinate System: North American Datum, 1983
Universal Transverse Mercator, Zone 19 North

APPENDIX C

Photographic Log

Photo 1. Isotria medeoloides growing along a steep embankment in leaf litter.

Photo 2. Photo showing habitat Isotria mediolodes was growing in; just up and to the right of the tree on the left side of the photo, with the yellow flagging wrapped around it.

Photo 3. Isotria medeoloides growing on steep hillslope leading to small forested stream.

Photo 4. Photo showing hillslope plant was growing on, the stream below, and the forest community it is growing within.

Photo 1. Gentiana rubricalis – S. of Jackson Pond Road. View of a plant from the top, showing shiny thicker leaves, clasping around the stem, and slightly whorled appearance

Photo 2. Gentiana rubricalis – S. of Jackson Pond Road. Closer view of a multi-stem cluster near cattails. The shiny leaf appearance and distinct leaf shape are apparent in this photo

Photo 3. Gentiana rubricalis – S. of Jackson Pond Road. Plants growing with associated species. This was a common association for the population

Photo 4. Gentiana rubricalis – S. of Jackson Pond Road. Plants growing with typical associated species. Photo also shows stem and leaf morphology

Photo 1. Gentiana rubricalis – S. of Beaudoin Road. Plants growing along edge of wetland in open ROW.

Photo 2. Gentiana rubricalis – S. of Beaudoin Road. Plants growing within forested cedar swamp up to 30 feet into the forest from the open ROW edge

Photo 3. Gentiana rubricalis – S. of Beaudoin Road. Plants growing in the forest edge, on hummocks within a forested cedar swamp.

Photo 4. Gentiana rubricalis – S. of Beaudoin Road. Typical ROW growing habitat along the edge of a cattail wetland

Photo 1. Carex siccata growing in patch near river.

Photo 2. View of Carex siccata population along river terrace.

Photo 3. Close-up of fruiting bodies of Carex siccata.

Photo 4. Close-up view of Carex siccata growing in amongst poison ivy and raspberry.

Photo 1. Overview of multiple stems of *Galium kamtschaticum* in old logging trail/actively used moose path GALKAM001DMC.

Photo 2. Stem of flowering *Galium kamtschaticum* GALKAM001DMC.

Photo 3. *Galium kamtschaticum* GALKAM001DMC.

Photo 4. Habitat overview of *Galium kamtschaticum* for GALKAM001DMC.

Photo 1. Overview of multiple stems of *Galium kamtschaticum* in old logging trail wetland GALKAM002DMC.

Photo 2. Stem of *Galium kamtschaticum* GALKAM002DMC and surrounding herbaceous community.

Photo 3. *Galium kamtschaticum* GALKAM002DMC.

Photo 1. Overview of multiple stems of *Galium kamtschaticum* in old logging trail drainage PEM wetland GALKAM003DMC.

Photo 2. *Galium kamtschaticum* GALKAM003DMC.

Photo 3. *Galium kamtschaticum* GALKAM003DMC displaying fruiting bodies.

Photo 4. *Galium kamtschaticum* GALKAM003DMC leaf structure

Photo 1. Dryopteris goldiana. One plant with six separate crowns.

Photo 2. Dryopteris goldiana. Top side of plant.

Photo 3. Dryopteris goldiana. Underside of plant.

Photo 4. Dryopteris goldiana. Showing immediate surrounding habitat, including impatiens, sedges, yellow birch.

Photo 1. Trichophorum clintonii. Close-up view of plant and fruiting bodies.

Photo 2. Trichophorum clintonii. Typical growth habitat for this population; under bracken fern, in association with bunchberry dogwood.

Photo 3. Trichophorum clintonii. Clump along the edge of the bracken fern and access road

Photo 4. Trichophorum clintonii. View of population area within the bracken fern and along the edge of the access road.

Photo 1. Lindernia dubia var. anagallidea. Specimen.

Photo 1. Overview of Jack Pine Forest Natural Community looking west JACKPINEWOOD004DMC.

Photo 2. Jack Pine Forest community looking west JACKPINEWOOD004DMC.

Photo 3. Jack Pine (*Pinus banksiana*) JACKPINEWOOD004DMC showing characteristic cone morphology.

Photo 4. Jack Pine Forest community looking northwest JACKPINEWOOD004DMC.

Photo 1. Overview of Jack Pine Forest Natural Community looking northwest JACKPINEWOOD005DMC.

Photo 2. Jack Pine Forest community looking west JACKPINEWOOD005DMC.

Photo 3. Jack Pine Natural community looking west JACKPINEWOOD005DMC.

Photo 4. Jack Pine Forest community looking north along logging trail JACKPINEWOOD005DMC.

Photo 1. Overview of Jack Pine Forest Natural Community looking east JACKPINEWOOD006DMC with bracken fern understory.

Photo 2. Jack Pine Forest community looking north along logging road JACKPINEWOOD006DMC.

Photo 3. Jack Pine Natural community looking west JACKPINEWOOD006DMC.

Photo 4. Jack Pine Forest community looking northwest at forest opening JACKPINEWOOD006DMC.

	
Photo 1. Upper Floodplain Hardwood Forest – Livermore Falls. Hardwood dominated stand with a fern-dominated understory.	Photo 2. Upper Floodplain Hardwood Forest – Livermore Falls. Hardwood-dominated stand with a fern-dominated understory.

	
Photo 1. Upper Floodplain Hardwood Forest – North Anson. Community is on an upper terrace associated with Carrabassett Stream. Forest structure is young.	Photo 2. Upper Floodplain Hardwood Forest – North Anson. Young hardwood stand with fern and other typical understory herbs, but lacking in indicators of rich soil.

	
Photo 1. Enriched Northern Hardwood Forest. Rich forest spanning drier areas of wetland.	Photo 2. Enriched Northern Hardwood Forest. Slight northern aspect, abundant maidenhair fern and only occasional basswood.

APPENDIX D

Completed Field Data Forms

- Special Plant Survey Forms
- Natural Community Forms

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC CMP Power	Survey Site:	NECE - CMP Corridor West
Quad name:	Lake Auburn East	Quad code:	44070B2
County:	Androscoggin	Town:	Greene

Plant Name: Isotria medeoloides ☒ New ☐ Update Occurrence #: 1

Date: 5 July2018	Surveyor(s): Art Gilman and Anna Ritchie	Sourcecode (MNAP assigns):
Primary Surveyor Address: Gilman and Briggs Environmental 1 Conti Cir # 5, Barre, VT 05641	Phone: (802) 479-7480	Email: avgilman@together.net

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat. 44.221891, Long.-70.168584

Directions to Occurrence: S of Allen Pond Campground Road, W side of CMP corridor, in forest ca. 90" W of treeline.
☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☒ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☒ Normal ☐ Other than normal Explain: Moderate to robust
# of Plants 1 ☒ Individuals ☐ Ramets Population Structure 100 % Vegetative % Reproductive	☒ In leaf ☐ In bud ☐ In flower ☐ Immature fruit ☐ Mature fruit ☐ Seed dispersing ☐ Dormant	☒ 1 square yard ☐ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☐ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: ☐ Sexual ☐ Asexual ☒ Not Observed
Other Comments:			

GENERAL DESCRIPTION

Associated natural community: Moderate mixed forest

Associated plant species: Trees 30'=TSUEA 30%, Red oak 40%, Red Maple 15%, Yellow Birch 15%, no understory vegetation in immediate vicinity; no herbs within 2 feet

Substrate/soil type: mineral soil covered by 2 inches of leaf litter and duff (red oak, yellow birch, beech, pine)

Threats to Population: just outside proposed clearing limits for the proposed corridor

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min ft / m Max ft / m	☒ N ☐ NE ☐ E ☐ NW ☐ S ☐ SE ☐ W ☐ SW ☐ Flat or NA	☐ Flat ☐ 0-10 ☐ 10-35 ☒ 35+ ☐ Vertical	☐ Open ☐ Partial ☐ Filtered ☒ Shade	☐ Crest ☐ Upper Slope ☒ Mid-slope ☐ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☐ Saturated (wet mesic) ☒ Moist (mesic) ☒ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☒ No ☐ Yes If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain Slight possibility it might be I. verticillata, wihich is not currently known to be extant in Maine.

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☒ Logging-most recently ~ >60 yrs ago	☐ Fire	☐ Dumping or mining
☐ Agriculture / Pasture	☐ Impoundment	☐ ORV / Vehicle disturbance
☐ Animal effects (insect outbreaks, browsing)	☐ Exotic plants	☐ Trails / Roads
☐ Wind or ice damage	☐ Erosion	☐ Other
		☐ No Evidence of disturbance

Describe: Approximately 90ft into the forest from edge of existing ROW clearing

Condition Rank
- ☒ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
- ☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
- ☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
- ☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
- ☐ **Other** / Habitat disturbed, consistent with needs of species / **Explain**:

SIZE / QUALITY: How large is this population relative to typical populations of this species? Low
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☐ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☐ **B** – Good ☒ **C** – Fair ☐ **D** – Poor

Comments: One plant, vigorous but no flowers this year.

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank
- ☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
- ☒ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
- ☐ **C** – Population surrounded by fragmented forest or rural landscape
- ☐ **D** – Surrounding area developed
- ☐ **Other** / Explain:

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☐ **B** – Good ☒ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC CMP Power	Survey Site:	S. of Jackson Pond Road
Quad name:	Bingham	Quad code:	45069A8
County:	Somerset	Town:	Concord

Plant Name: Gentiana rubricaulis ☐ New ☒ Update Occurrence #:

Date: 6July2018	Surveyor(s): Art Gilman and Anna Ritchie	Sourcecode (MNAP assigns):
Primary Surveyor Address: Gilman and Briggs Environmental 1 Conti Cir # 5, Barre, VT 05641	Phone: (802) 479-7480	Email: avgilman@together.net

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat. 45.023784, Long. -69.883264

Directions to Occurrence: From Me, Rte. 16 in Concord, take Jackson Pond Road to CMP powerlines. On foot, follow powerlines S over knoll; access/woods road diverges E from open corridor, but follow this around E side of marshy wetland and re-enter open corridor. Plants are at marsh edge mostly along E side of open corridor but extending around powerline structure and across corridor on the side of the marsh and somewhat uphill.
☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☒ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☒ Normal ☐ Other than normal Explain:
# of Plants 150 ☒ Individuals ☐ Ramets Population Structure 100 % Vegetative 0 % Reproductive	☒ In leaf ☐ In bud ☐ In flower ☐ Immature fruit ☐ Mature fruit ☐ Seed dispersing ☐ Dormant	☐ 1 square yard ☐ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☒ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: ☐ Sexual ☐ Asexual ☒ Not Observed

Other Comments:

GENERAL DESCRIPTION

Associated natural community: Shallow marsh - sloping edge

Associated plant species: Packera shweinitziana, Geum aleppicum, Thelypteris palustris, Platanthera psycodes,

Substrate/soil type: Mapped as Berkshire f.s.l

Threats to Population:

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min 450ft ft / m Max ft / m	☐ N ☐ NE ☐ E ☒ NW ☐ S ☐ SE ☐ W ☐ SW ☐ Flat or NA	☐ Flat ☒ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☒ Open ☐ Partial ☐ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☐ Mid-slope ☒ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☒ Saturated (wet mesic) ☐ Moist (mesic) ☐ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☒ No ☐ Yes If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☐ Logging-most recently ~ yrs ago
☐ Agriculture / Pasture
☐ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☐ Trails / Roads
☒ Other
☐ No Evidence of disturbance

Describe: Powerline corridor

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☒ **Other** / Habitat disturbed, consistent with needs of species / **Explain**: Powerline maintains non-forested condition

SIZE / QUALITY: How large is this population relative to typical populations of this species? Mid-sized
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☒ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor

Comments: Population similar to when obsvered in 2007/2008; although plants are typically biennial or shrot-lived perennial, they seem to maintain numbers and vigor over time.

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☐ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☒ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☒ **Other** / Explain: Cleared powerline corridor

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC CMP Power	Survey Site:	S. of Beaudoin Road
Quad name:	Pleasant Ridge Pit	Quad code:	45069A8
County:	Somerset	Town:	Moscow

Plant Name: Gentiana rubricaulis ☒ New ☐ Update Occurrence #:

Date: 11July2018	Surveyor(s): Art Gilman and Anna Ritchie	Sourcecode (MNAP assigns):
Primary Surveyor Address: Gilman and Briggs Environmental 1 Conti Cir # 5, Barre, VT 05641	Phone: (802) 479-7480	Email: avgilman@together.net

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat. 45.094096, Long.-69.878232

Directions to Occurrence: Drive north out of Bingham,take stream road and the a left onto Beaudoin road, follow until you reach the existing R Population extends from just south of the road to approximately 800 feet south, along the edges of the wetland along the west side of the clearin extending into the forest for approximately 30 feet.
☒ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☐ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☒ Normal ☐ Other than normal Explain:
# of Plants 150 ☒ Individuals ☐ Ramets Population Structure 100 % Vegetative 0 % Reproductive	☒ In leaf ☐ In bud ☐ In flower ☐ Immature fruit ☐ Mature fruit ☐ Seed dispersing ☐ Dormant	☐ 1 square yard ☐ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☒ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: ☐ Sexual ☐ Asexual ☒ Not Observed

Other Comments: Plants are distributed along the edges of the wetland, rarely extending into the supersaturated areas, however, in the forest, th are located on humocks within the cedar swamp area.

GENERAL DESCRIPTION

Associated natural community: Shallow marsh - sloping edge and cedar swam hummocks

Associated plant species: Carex flava, Typha latifolia, Salix discolor

Substrate/soil type:

Threats to Population:

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min ft / m Max ft / m	☐ N ☐ NE ☐ E ☐ NW ☒ S ☐ SE ☐ W ☐ SW ☒ Flat or NA	☐ Flat ☒ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☒ Open ☐ Partial ☒ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☐ Mid-slope ☒ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☒ Saturated (wet mesic) ☐ Moist (mesic) ☐ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☒ No ☐ Yes If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☐ Logging-most recently ~ yrs ago
☐ Agriculture / Pasture
☐ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☐ Trails / Roads
☒ Other
☐ No Evidence of disturbance

Describe: Powerline corridor

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☒ **Other** / Habitat disturbed, consistent with needs of species / **Explain**: Powerline maintains non-forested condition

SIZE / QUALITY: How large is this population relative to typical populations of this species? Mid-sized
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☒ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor
Comments:

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☐ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☒ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☒ **Other** / Explain: Cleared powerline corridor and second growth cedar swamp

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC CMP Power	Survey Site:	Bell Farms Area/S. of Cotton Road
Quad name:	Lewiston	Quad code:	44070A2
County:	Androscoggin	Town:	Lewiston

Plant Name: Carex siccata (CASI01AR_02AR) ☐ New ☒ Update Occurrence #:

Date: 3July2018	Surveyor(s): Art Gilman and Anna Ritchie	Sourcecode (MNAP assigns):
Primary Surveyor Address: Gilman and Briggs Environmental 1 Conti Cir # 5, Barre, VT 05641	Phone: (802) 479-7480	Email: avgilman@together.net

GPS Datum ☐ WGS 84 ☒ NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat. 44.023698 Long.-70.175755

Directions to Occurrence: Located south of Cotton Road, on the low river terrace at the powerline crossing
☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☒ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☐ Normal ☒ Other than normal Explain: Slightly suppressed; competing vegetation
# of Plants 3000-5000 ☐ Individuals ☒ Ramets Population Structure 99 % Vegetative 1 % Reproductive	☐ In leaf ☐ In bud ☐ In flower ☐ Immature fruit ☒ Mature fruit ☐ Seed dispersing ☐ Dormant	☐ 1 square yard ☐ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☒ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: ☒ Sexual ☒ Asexual ☐ Not Observed

Other Comments: Mapped outer extent of two population groups. Large clonal patches

GENERAL DESCRIPTION

Associated natural community: Riverbank terrace/powerline corridor

Associated plant species: Rubus flagellaris, Elymus repens

Substrate/soil type: Sand; stable/fully vegetated

Threats to Population:

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min ft / m Max ft / m	☐ N ☐ NE ☐ E ☐ NW ☒ S ☐ SE ☐ W ☐ SW ☐ Flat or NA	☐ Flat ☒ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☒ Open ☐ Partial ☐ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☐ Mid-slope ☐ Lower Slope ☒ Bottom ☐ Level Plain	☐ Inundated ☐ Saturated (wet mesic) ☐ Moist (mesic) ☒ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☐ No ☒ Yes If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain Other sedges primarily Section Ovales with much different inflorescences.

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☐ Logging-most recently ~ yrs ago
☐ Agriculture / Pasture
☐ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☒ Trails / Roads
☒ Other
☐ No Evidence of disturbance

Describe: Powerline corridor crossing river.

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☒ **Other** / Habitat disturbed, consistent with needs of species / **Explain**: Managed powerline corridor

SIZE / QUALITY: How large is this population relative to typical populations of this species?
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☒ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor
Comments: Patches fairly large; competetion from other sun-loving species (shrubs)

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☐ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☒ **Other** / Explain: Cleared powerline corridor in rural/agricultural surrounding

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC Segment 1	Survey Site:	FID #14 GALKAM001DMC
Quad name:	Tumbledown Mountain Quadrangle	Quad code:	USGS X24K45909
County:	Somerset	Town:	Appleton Township

Plant Name: Galium Kamtschaticum ☒ New ☐ Update Occurrence #:

Date: 7/11/18	Surveyor(s): Duane Choquette & Tom Errico	Sourcecode (MNAP assigns):
Primary Surveyor Address: 6 Ashley Drive, Scarborough, maine 04072	Phone: 518-222-1383	Email: dchoquette@trcsolutions.com

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☒ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat: 45.46625971 Long: -70.46817762

Directions to Occurrence: North slope of Tumbledown Mountain, access from Appleton Road to the west.
☒ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☒ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☒ Normal ☐ Other than normal Explain:
# of Plants 506 ☒ Individuals ☐ Ramets Population Structure 80 % Vegetative 20 % Reproductive	☒ In leaf ☒ In bud ☒ In flower ☒ Immature fruit ☒ Mature fruit ☐ Seed dispersing ☐ Dormant	☐ 1 square yard ☐ 1 – 5 square yards ☒ 5 – 20 square yards ☐ 20 – 100 square yards ☐ 100 sq yds to 1 acre ☐ 1 acre + 13 sq yds~area **actual** habitat 30 sq yds~ area **potential** habit	Evidence disease, predation, etc? Explain: Browsing damage to tips of plants ☒ Yes ☐ No Type of reproduction? Explain: Fruit present ☒ Sexual ☐ Asexual ☐ Not Observed

Other Comments:

GENERAL DESCRIPTION

Associated natural community: Northern Hardwood forest

Associated plant species: Acer saccharum, Betula alleghaniensis, Acer pensylvanicum,Glyceria striata, Impatiens capensis, Thalictrum polygamin, Oxalis montana, Galium palustre, Circaea alpina, sambucus raecemosa

Substrate/soil type: Mucky Mineral

Threats to Population: Damage caused by moose wallowing and moose trails. Logging

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min 2200 ft / m Max 2310 ft / m	☒ N ☐ NE ☐ E ☐ NW ☐ S ☐ SE ☐ W ☐ SW ☐ Flat or NA	☐ Flat ☐ 0-10 ☒ 10-35 ☐ 35+ ☐ Vertical	☐ Open ☐ Partial ☒ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☒ Mid-slope ☐ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☐ Saturated (wet mesic) ☒ Moist (mesic) ☐ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☐ No ☒ Yes If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☒ Logging-most recently ~ 30 yrs ago
☐ Agriculture / Pasture
☒ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☒ Trails / Roads
☐ Other
☐ No Evidence of disturbance

Describe: site is an old logging road, with a moose trail running down it. Plants are located on edge of moose trail.

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☒ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☐ **Other** / Habitat disturbed, consistent with needs of species / **Explain**:

SIZE / QUALITY: How large is this population relative to typical populations of this species? unknown
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☒ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor
Comments: dense population flanking an old logging road. Surrounding habitat was logged 25+ years ago.

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments: The surrounding land is all utilized for logging and is currently in a regenerative state from the last logging cycle.

Landscape Rank
☒ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☒ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☐ **Other** / Explain:

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments: Under current conditions the population will likely continue to expand, with occasional damage from moose wallowing in the wetter portions of the habitat.

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC Segment 1	Survey Site:	FID #14 GALKAM002DMC
Quad name:	Tumbledown Mountain Quadrangle	Quad code:	USGS X24K45909
County:	Somerset	Town:	Appleton Township

Plant Name: Galium Kamtschaticum ☒ New ☐ Update Occurrence #:

Date: 7/11/18	Surveyor(s): Duane Choquette & Tom Errico	Sourcecode (MNAP assigns):
Primary Surveyor Address: 6 Ashley Drive, Scarborough, maine 04072	Phone: 518-222-1383	Email: dchoquette@trcsolutions.com

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☒ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat: 45.46604628 Long: -70.46943957

Directions to Occurrence: North slope of Tumbledown Mountain, access from Appleton Road to the west.
☒ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☒ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☒ Normal ☐ Other than normal Explain:
# of Plants 16 ☒ Individuals ☐ Ramets Population Structure 95 % Vegetative 5 % Reproductive	☒ In leaf ☐ In bud ☒ In flower ☐ Immature fruit ☒ Mature fruit ☐ Seed dispersing ☐ Dormant	☒ 1 square yard ☐ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☐ 100 sq yds to 1 acre ☐ 1 acre + 0.9 sq yds~area **actual** habitat 50 sq yds~ area **potential** habit	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: Fruit present ☒ Sexual ☐ Asexual ☐ Not Observed
Other Comments:			

GENERAL DESCRIPTION

Associated natural community: Northern Hardwood forest

Associated plant species: Acer saccharum, Betula alleghaniensis, Acer pensylvanicum,Glyceria striata, Impatiens capensis, Galium palustre, Circaea alpina, sambucus raecemosa, Corylus cornuta, Nabalus altissimus, Carex utriculata, Osmunda claytonia, Trillium undulatum

Substrate/soil type: Mucky Mineral

Threats to Population: Old Logging Road, Adjacent to clearcut activities.

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min 2300 ft / m Max 2320 ft / m	☐ N ☐ NE ☐ E ☒ NW ☐ S ☐ SE ☐ W ☐ SW ☐ Flat or NA	☐ Flat ☒ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☐ Open ☐ Partial ☒ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☒ Mid-slope ☐ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☒ Saturated (wet mesic) ☐ Moist (mesic) ☐ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☐ No ☒ Yes If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☒ Logging-most recently ~ 30 yrs ago
☐ Agriculture / Pasture
☒ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☒ Trails / Roads
☐ Other
☐ No Evidence of disturbance

Describe: site is a junction of two old logging roads, with a hillside seep upslope

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☒ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☐ **Other** / Habitat disturbed, consistent with needs of species / **Explain**:

SIZE / QUALITY: How large is this population relative to typical populations of this species? unknown
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☒ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor
Comments: Surrounding forest was logged 25+ years ago, open logging cut located 75' to the west

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments: The surrounding land is all utilized for logging and is currently in a regenerative state from the last logging cycle.

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☒ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☐ **Other** / Explain:

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments: t.

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC Segment 1	Survey Site:	FID #14 GALKAM003DMC
Quad name:	Tumbledown Mountain Quadrangle	Quad code:	USGS X24K45909
County:	Somerset	Town:	Appleton Township

Plant Name: Galium Kamtschaticum ☒ New ☐ Update Occurrence #:

Date: 7/11/18	Surveyor(s): Duane Choquette & Tom Errico	Sourcecode (MNAP assigns):
Primary Surveyor Address: 6 Ashley Drive, Scarborough, maine 04072	Phone: 518-222-1383	Email: dchoquette@trcsolutions.com

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☒ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat: 45.46598048 Long: -70.46956785

Directions to Occurrence: North slope of Tumbledown Mountain, access from Appleton Road to the west.
☒ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☒ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☒ Normal ☐ Other than normal Explain:
# of Plants 85 ☒ Individuals ☐ Ramets Population Structure 90 % Vegetative 10 % Reproductive	☒ In leaf ☐ In bud ☒ In flower ☐ Immature fruit ☒ Mature fruit ☐ Seed dispersing ☐ Dormant	☐ 1 square yard ☐ 1 – 5 square yards ☒ 5 – 20 square yards ☐ 20 – 100 square yards ☐ 100 sq yds to 1 acre ☐ 1 acre + 7 sq yds~area **actual** habitat 50 sq yds~ area **potential** habit	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: Fruit present ☒ Sexual ☐ Asexual ☐ Not Observed

Other Comments:

GENERAL DESCRIPTION

Associated natural community: Northern Hardwood forest

Associated plant species: Acer saccharum, Betula alleghaniensis, Acer pensylvanicum,Glyceria striata, Impatiens capensis, Carex utriculata, Osmunda claytonia, Carex gynandra

Substrate/soil type: Mucky Mineral

Threats to Population: Old Logging Road, Adjacent to clearcut activities.

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min 2300 ft / m Max 2325 ft / m	☐ N ☐ NE ☐ E ☒ NW ☐ S ☐ SE ☐ W ☐ SW ☐ Flat or NA	☐ Flat ☒ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☐ Open ☒ Partial ☐ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☒ Mid-slope ☐ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☒ Saturated (wet mesic) ☐ Moist (mesic) ☐ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☐ No ☒ Yes If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☒ Logging-most recently ~ 30 yrs ago
☐ Agriculture / Pasture
☒ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☒ Trails / Roads
☐ Other
☐ No Evidence of disturbance

Describe: The site is on an old logging road.

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☒ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☐ **Other** / Habitat disturbed, consistent with needs of species / **Explain**:

SIZE / QUALITY: How large is this population relative to typical populations of this species? unknown
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☒ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor

Comments: Surrounding forest was logged 25+ years ago, open logging cut located 75' to the west

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments: The surrounding land is all utilized for logging and is currently in a regenerative state from the last logging cycle.

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☒ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☐ **Other** / Explain:

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments: t.

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC CMP Power	Survey Site:	Off of Stream Road/S. of Deadwater Radar Station
Quad name:	Mahoney Hill	Quad code:	45069A7
County:	Somerset	Town:	Moscow

Plant Name: Dryopteris goldieana ☒ New ☐ Update Occurrence #:

Date: 12July2018	Surveyor(s): Art Gilman and Anna Ritchie	Sourcecode (MNAP assigns):
Primary Surveyor Address:	Phone:	Email:

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat. 45.117098, Long. -69.861951

Directions to Occurrence: Take Stream Road, off of Highway 16 (north of Bingham) to where it parallels the existing powerline. Just before the powerline bends to the east, there is a side road that takes off towards Austin Stream. Stop here and head northwest. The population is locat swampy draw/old road, approximately 70 feet into the woods from the west side of the ROW clearing
☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☒ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☒ Normal ☐ Other than normal
# of Plants 2 ☒ Individuals ☐ Ramets Population Structure 30 % Vegetative 70 % Reproductive	☐ In leaf ☐ In bud ☐ In flower ☒ Immature fruit ☐ Mature fruit ☐ Seed dispersing ☐ Dormant	☐ 1 square yard ☒ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☐ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Explain: Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: spores and multiple plants from one crown ☒ Sexual ☒ Asexual ☐ Not Observed

Other Comments: Took a single point between the two individuals; wich were approximately 3 ft apart

GENERAL DESCRIPTION

Associated natural community: Moist clearing in mucky loam in drainage/old road bed embedded in beech-maple-birch forest

Associated plant species: Impatiens capensis (presumed, no flowers seen); Glyceria striata, Alnus serrulata,

Substrate/soil type: Mucky loam, spongy with high organics

Threats to Population:

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min 1120' ft / m Max ft / m	☐ N ☐ NE ☐ E ☐ NW ☐ S ☐ SE ☐ W ☐ SW ☒ Flat or NA	☐ Flat ☒ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☐ Open ☐ Partial ☒ Filtered ☐ Shade	☐ Crest ☒ Upper Slope ☐ Mid-slope ☐ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☒ Saturated (wet mesic) ☒ Moist (mesic) ☐ Dry-mesic ☐ Dry (xeric)

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☐ No ☒ Yes Dryopteris carthusiana If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☐ Logging-most recently ~ yrs ago
☐ Agriculture / Pasture
☐ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☒ Trails / Roads
☒ Other
☐ No Evidence of disturbance

Describe: Powerline corridor nearby

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☒ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☒ **Other** / Habitat disturbed, consistent with needs of species / **Explain**: Small population (likely one clone), limited availanle habitat in small swale; managed powerline corridor nearby and old logging activity crisscrosses the area

SIZE / QUALITY: How large is this population relative to typical populations of this species? Small
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☒ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☐ **B** – Good ☒ **C** – Fair ☐ **D** – Poor

Comments: Consists of one clone, but that appears to be fairly old with several "crowns" off one rhizome.

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments: C

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☒ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☒ **Other** / Explain: in woods off of cleared powerline corridor in rural managed forest area

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☐ **B** – Good ☒ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC CMP Power	Survey Site:	Wyman Dam Access Road
Quad name:	Bingham	Quad code:	45069A8
County:	Somerset	Town:	Moscow

Plant Name: Houstonia longifolia ☐ New ☒ Update Occurrence #:

Date: 6 July2018	Surveyor(s): Art Gilman and Anna Ritchie	Sourcecode (MNAP assigns):
Primary Surveyor Address: Gilman and Briggs Environmental 1 Conti Cir # 5, Barre, VT 05641	Phone: (802) 479-7480	Email: avgilman@together.net

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat. 45.067711, Long.-69.898568

Directions to Occurrence: Located to the south side of the Wyman Dam access road, where the current powerline ROW crosses the road as it co south from the dam
☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☒ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☐ Normal ☒ Other than normal Explain: Normal in recently (<10 years) disturbed microhabitats, vigor depressed in more stabilized (lichenized) microhabitats
# of Plants 500 ☒ Individuals ☐ Ramets Population Structure 100 % Vegetative 0 % Reproductive	☒ In leaf ☒ In bud ☒ In flower ☐ Immature fruit ☐ Mature fruit ☐ Seed dispersing ☐ Dormant	☐ 1 square yard ☐ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☒ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: ☒ Sexual ☐ Asexual ☐ Not Observed

Other Comments: mapped outer extent of disperse population. Individuals were very scattered; sometimes clumped and sometimes disperse. Number of individuals estimated between 400-500

GENERAL DESCRIPTION

Associated natural community: Shallow marsh - slopine edge

Associated plant species: Danthonia spicata, Centaurea stoebe, Juniperus communis, Drymocallis arguta, Lechea intermedia

Substrate/soil type: Gravel alluvium/ topsoil removed/scraped

Threats to Population:

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min ft / m Max ft / m	☐ N ☐ NE ☐ E ☒ NW ☐ S ☐ SE ☐ W ☐ SW ☒ Flat or NA	☐ Flat ☒ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☒ Open ☐ Partial ☐ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☐ Mid-slope ☐ Lower Slope ☐ Bottom ☒ Level Plain	☐ Inundated ☐ Saturated (wet mesic) ☐ Moist (mesic) ☒ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☒ No ☐ Yes Collection # Repository	☐ No ☒ Yes Houstonia caerulea (a few) If yes, are there hybridization issues? ☒ No; ☐ Yes; Explain Are there identification issues? ☒ No; ☐ Yes; Explain Plant habit of two species much different

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☐ Logging-most recently ~ yrs ago
☐ Agriculture / Pasture
☐ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☒ Trails / Roads
☒ Other
☐ No Evidence of disturbance

Describe: Powerline corridor near dam operations on river terrace

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☒ **Other** / Habitat disturbed, consistent with needs of species / **Explain**: Plants most vigorous in areas disturbed for pole intallation a few years ago.

SIZE / QUALITY: How large is this population relative to typical populations of this species? Large
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☒ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor

Comments: When first observed this was a very large, very vigoorus population but is now much smaller in terms of numbers and vigor of plants, due primarily to stabilization of the habitat, especially by lichens (which acidify habitat conditions and suppress plant growth, seeedlign survival, etc,).

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☐ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☒ **Other** / Explain: Not a natural habitat; maintained by powerline maintenance

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments: Rank diminishing but still a large population, and likely a large seed-bank present as well.

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC CMP	Survey Site:	N. of Bassett Lane/Chase Stream
Quad name:	Mahoney Hill	Quad code:	45069A7
County:	Somerset	Town:	Moscow

Plant Name: Trichophorum clintonii ☒ New ☐ Update Occurrence #:

Date: 12 July 2018	Surveyor(s): Art Gilman and Anna Ritchie	Sourcecode (MNAP assigns):
Primary Surveyor Address: Gilman and Briggs Environmental 1 Conti Cir # 5, Barre, VT 05641	Phone:	Email: avgilman@together.net

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat. 45.101345, Long.-69.872975

Directions to Occurrence: North of Bassett Lane on the west side of the ROW crossing, about 100 ft up the access road. The population is most the east side of the access road, under the bracken fern, with some clumps in the road and along the west side
☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☐ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☒ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☐ Normal ☒ Other than normal Explain: Slightly suppressed; competing vegetation
# of Plants 15+/- ☐ Individuals ☒ Ramets Population Structure 40 % Vegetative 60 % Reproductive	☒ In leaf ☐ In bud ☐ In flower ☐ Immature fruit ☒ Mature fruit ☒ Seed dispersing ☐ Dormant	☐ 1 square yard ☐ 1 – 5 square yards ☒ 5 – 20 square yards ☐ 20 – 100 square yards ☐ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: ☒ Sexual ☐ Asexual ☐ Not Observed

Other Comments: Polygon represents approximate distribution of observed clumps; unconventional habitat for species, which is typically found adjacent to rivers/streams.

GENERAL DESCRIPTION

Associated natural community: Dry sandy soil in and adjacent to access road/powerline corridor

Associated plant species: Pteridium aquilinum, Juncus tenuis

Substrate/soil type: sandy loam with gravel

Threats to Population:

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min 650' ft / m Max ft / m	☐ N ☐ NE ☐ E ☐ NW ☒ S ☐ SE ☐ W ☐ SW ☐ Flat or NA	☐ Flat ☐ 0-10 ☒ 10-35 ☐ 35+ ☐ Vertical	☒ Open ☐ Partial ☐ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☒ Mid-slope ☐ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☐ Saturated (wet mesic) ☐ Moist (mesic) ☒ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☐ No ☒ Yes Collection # Gilman18024 Repository avg	☒ No ☐ Yes If yes, are there hybridization issues? ☐ No; ☐ Yes; Explain Are there identification issues? ☐ No; ☒ Yes; Explain Somewhat depauperate; fruit already dispersed, and unusual habitat

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☐ Logging-most recently ~ yrs ago
☐ Agriculture / Pasture
☐ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☒ Trails / Roads
☒ Other
☐ No Evidence of disturbance

Describe: Powerline corridor

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☒ **Other** / Habitat disturbed, consistent with needs of species / **Explain**: Managed powerline corridor

SIZE / QUALITY: How large is this population relative to typical populations of this species?
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☐ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☐ **B** – Good ☒ **C** – Fair ☐ **D** – Poor
Comments: Robust clumps, population fairly large, but atypical habitat

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☐ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☒ **Other** / Explain: Cleared powerline corridor in rural/managed forest setting

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☐ **B** – Good ☒ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments: Atypical, appears stable but may decline over time.

MNAP reviewed / verified rank ☒ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site:	NECEC CMP	Survey Site:	S of Plaisted Road
Quad name:	Wilton	Quad code:	4407000
County:	Franklin	Town:	Jay

Plant Name: Lindernia dubia var. anagallidea ☒ New ☐ Update Occurrence #:

Date: 28 July 2018	Surveyor(s): Art Gilman	Sourcecode (MNAP assigns):
Primary Surveyor Address: Gilman and Briggs Environmental 1 Conti Cir # 5, Barre, VT 05641	Phone: 802-479-7480	Email: avgilman@together.net

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☒ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates Lat. 44.54054, Long. -70.163594

Directions to Occurrence: In abandoned gravel pit area S of Plaisted Road, under existing powerlines: either enter using access to existing gravel pit, or follow snowmobile trail downslope from Plaisted Road; eventually turn left on old road into pit area; plants in a small mud-puddle area in disturd/abandoned pit floor

☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☒ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☐ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☒ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☐ Normal ☒ Other than normal Explain: Starved/small
# of Plants 15-20 ☐ Individuals ☒ Ramets Population Structure 40 % Vegetative 60 % Reproductive	☒ In leaf ☐ In bud ☐ In flower ☐ Immature fruit ☒ Mature fruit ☒ Seed dispersing ☐ Dormant	☐ 1 square yard ☒ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☐ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Evidence disease, predation, etc? Explain: ☐ Yes ☒ No Type of reproduction? Explain: ☒ Sexual ☐ Asexual ☐ Not Observed

Other Comments: Very limited availabel habitat (mud-puddle damp, vs. dry sand surrounding)

GENERAL DESCRIPTION

Associated natural community: NA/ general forest/powerline/gravel pit

Associated plant species: Juncus tenuis, Agalilnis tenuifolia

Substrate/soil type: sandy, slight mud surface

Threats to Population:

Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min 590' ft / m Max ft / m	☐ N ☐ NE ☐ E ☐ NW ☐ S ☐ SE ☐ W ☐ SW ☒ Flat or NA	☒ Flat ☐ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☒ Open ☐ Partial ☐ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☐ Mid-slope ☐ Lower Slope ☒ Bottom ☐ Level Plain	☐ Inundated ☐ Saturated (wet mesic) ☒ Moist (mesic) ☐ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☒ Yes	☐ No ☒ Yes Collection # Gilman18031 Repository avg	☒ No ☐ Yes If yes, are there hybridization issues? ☐ No; ☐ Yes; Explain Are there identification issues? ☐ No; ☒ Yes; Explain Depauperate

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☐ Logging-most recently ~ yrs ago
☐ Agriculture / Pasture
☐ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☒ Dumping or mining
☐ ORV / Vehicle disturbance
☒ Trails / Roads
☒ Other
☐ No Evidence of disturbance

Describe: Gravel quarry

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☒ **Other** / Habitat disturbed, consistent with needs of species / **Explain**: Managed powerline corridor/gravel pit

SIZE / QUALITY: How large is this population relative to typical populations of this species? ? Small
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☐ Yes ☒ No

Size / Quality Rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☒ **D** – Poor

Comments: Small population, depauperate plants; not sustainable

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☐ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☒ **Other** / Explain: Gravel pit/quarry

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☒ **E** – Extant

Comments:

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

NATURAL COMMUNITY SURVEY

Project New England Clean Energy Connect (NECEC)

I. IDENTIFIERS / LOCATION

Site Name: NECEC FID #11	**Obs. Pt. #: JACKPINEWOOD004DMC**	**Quadcode:**
Field-assigned Community Type: Jack Pine Forest Identification or classification difficulties? Describe: None		USGS 7.5' Quad Name: Spencer Lake Quadrangle Town: Bradstreet Township T4 R7
MNAP REVIEWED/EdITED TYPE:	Occurrence #:	County: Somerset
LANDOWNER INFORMATION: for each landowner Map | Lot | Name (& address if new landowner)		Date: 7/18/18 Surveyors: Duane Choquette & Tom Errico SourceCode: F_____ Biophysical Region: Western Mountains

GPS Coordinates (● NAD 83, UTM Zone 19N; ☐ Other-please specify) centerpoint Lat: 45.49568, Long: -70.25400

Directions to occurrence: From the Town of Jackman, Maine: Take State Route 201 south to Spencer Road. Spencer Road west to Moore Pond, Proceed north to Egg Pond. Jack Pine woodland is northwest of Egg pond, between egg pond and Bitter Brook.

● Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

FEATURE MAP. Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation. Locational uncertainty refers to any uncertainty there is as to where the actual observation occurred. Confidence extent indicates how confident you are that the observed area represents the full extent of the feature.

Locational Uncertainty:None

☐ Areal delimited

● Mapped to within 12.5 m of actual location

☐ Greater uncertainty (please indicate)

_____50_____ m / ft / km / miles

Confidence Extent:

☐ **Y** - Confident full extent of feature **IS** known

● **N** - Confident full extent is **NOT** known

☐ **?** - **Uncertain** whether full extent is known

GENERAL DESCRIPTION OF COMMUNITY(See instructions for guidelines):

Predominately Jack pine (70%), with mixed white pine, red pine and red spruce in the canopy. The understory is dry and open, with lowbush blueberries and laurels found sporadically in patches. The Jack Pine woodland abuts regenerating clear-cuts to both the east and west, which are dominated by young red spruce, though scattered young jack pines can be found throughout.

SAMPLE TYPE:	Additional sampling recommended?
____ Brief descriptive – **NOT SUFFICIENT FOR DOCUMENTING NEW EOs**	X Yes ☐ No
__X__ Generalized cover estimates & dbhs (p2)	Photos: X Yes ☐ No
____ Nested plot samples (N = _____) (attach)	

II. VEGETATION BY STRATA

Community name & EO#:

TREE LAYER (canopy plus emergents, everything ≥ 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% [60%] **70%** 80% 90+%

Total Basal Area: ft²/acre | Conifer %:100 | Canopy height _50ft_____ m or ft | Supercanopy spp?

Species name/code	Cover class*	Dbh range X☐in ☐ cm	Core ages	Species name/code	Cover class*	Dbh range ☐in ☐cm	Core ages	☐ check here if plot data are attached instead
Pinus banksiana	87							
Pinus strobus	9	6-8						
Picea rubens	9	6-8						
Pinus resinosa	1	4-8						
		6-8						

SAPLING / TALL SHRUB LAYER (> 3 m tall and < 10 cm dbh)

TOTAL COVER OF STRATUM: <5% [10%] 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Picea rubens	3			
Pinus banksiana	9			

SHRUB LAYER (woody plants ~1 - 3 m tall)

TOTAL COVER OF STRATUM: <5% 10% [20%] 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Kalmia angustifolia	19			
Vaccinium angustifolium	19			

HERB / DWARF SHRUB LAYER (all herbaceous vascular plants plus any woody plants < 1 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% [40%] 50% 60% 70% 80% 90+%

DOMINANCE : tree regen___10_____%; shrub__10_____%; graminoid____0____%; forb___20____%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Pteridium aquilinum	37			
Gaultheria procumbens	19			
Cornus canadensis	19			

BRYOID LAYER (all ground-layer non-vascular plants; do not include epiphytes)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% [70%] 80% 90+%

DOMINANCE: bryophytes___100_____% lichens _____%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Pleurozium schreberi	87			
Huperzia lucidula	19			

*cover classes (**midpoint**): < 2%= **1**, 2-5%= **3**, 6-12%= **9**, 13-24%= **19**, 25-49%= **37**, 50-74%= **63**, 75-100%= **87**

ADDITIONAL SPECIES within area where vegetation cover by strata were taken

Stratum	Species code	Cover class	Stratum	Species code	Cover class

OTHER PLANT SPP seen in community (spp codes), for complete plant species list

III. ENVIRONMENTAL SETTING

Community name & EO#:

SOILS (rooting zone):

Sample #_004___

Depth to which soil examined___25cm_____

Organic layer depth_____12_____cm or ☐ >1 m

Mineral layer below organic? ____yes___depth___12cm_____

Mottling in top 30 cm?___No____depth_____

Depth to water table:__unknown_____

Depth to obstruction:__25cm_____ nature of obstruction:____bedrock_____

Stoniness: ☐ very little (<1%)/ ● moderate (2-25%)/ ☐ very (>25%)

pH:__unknown_____ measured in ☐ soil or ☐ interstitial water

vonPost decomposition (peat substrates only) _____ at _____ deep

ELEVATION:1200ft

☐ m or ● ft?

ASPECT (TRUE): South

SLOPE : Include units! (45º = 100%)

10% = 25%

☐ measured ● estimated

HYDROLOGIC REGIME:

☐ upland

☐ nontidal wetland:
- ☐ perm flooded
- ☐ semiper flooded
- ☐ seasonally fld.
- ☐ saturated

☐ tidal – irreg. fld.
☐ tidal – reg. fld.
- ☐ saltwater
- ☐ brackish
- ☐ freshwater

☐ unknown

HABITAT PATCHINESS (describe zones or patches if present):

Dense central stand, outer edges border logging clearcuts with regenerating spuce being dominant.

MICROTOPOGRAPHY:

Jack Pine Forest is on a small hill overlooking regenerating clear cuts on West, North and East sides.

AVERAGE TEXTURE:

☐ gravel
☐ sand
● loamy sand / sandy loam
☐ loam
☐ silt loam
☐ clay loams
☐ sandy clay / clay
☐ peat
☐ muck

DRAINAGE & MOISTURE REGIME (see MAPPSS key):

☐ very poorly drained
☐ poorly drained
☐ somewhat poorly drained
☐ moderately well drained
☐ well drained
☐ somewhat excessively drained
☐ excessively drained

BEDROCK TYPE:

☐ Igneous
- ● granite
- ☐ dioritic
- ☐ gabbroic

☐ Metamorphic
- ☐ slate/phyllite
- ☐ schist/gneiss

☐ Sedimentary
- ☐ limestone
- ☐ other

details?

TOPOGRAPHIC POSITION

☐ D drainage channel
☐ P low plain, level
☐ N narrow valley
☐ T toe of slope
☐ L lower slope
☐ M middle slope
● T hillside terrace
☐ U upper slope
☐ E cliff/ledge
☐ S ridge, summit, crest

SURFICIAL DEPOSIT:

● bedrock
☐ talus slope
☐ glacial till
☐ moraine
☐ esker/outwash
☐ glacial delta
☐ lacustrine/fluvial
☐ marine
☐ aeolian
☐ other:

THREATS TO COMMUNITY? Logging

MANAGEMENT / PROTECTION NEEDS?

OTHER COMMENTS: animal use, species distribution notes, etc.
Jack pine forest northwest of Egg pond. The stand is bordered by three large logging cuts, to the north east, and west. The Jack pine Forest extends south outside of the study corridor. An examination of aerial photography and field reconnaissance shows the jack pine forest ending in a spruce bog community.

IV. SUMMARY AND RANKING

Community name & EO#:

Applicable National Type:	NVC CODE: CEGL00_____	Comment re fit to type?

COMMUNITY RANKING

1. CURRENT CONDITION and quality of the community itself.

- Comment on the species composition and biological structure of the community (species diversity, indicator species, development/maturity, etc.) For forests: Do you consider this to be old growth? If so, based on what?

- Natural and anthropogenic disturbance **within** the community (check off, then describe extent and how recent below)

● Logging – most recently c. __20+_____ yrs ago	☐ Animal effects (insect outbreaks, browsing)
☐ Agriculture / pasture	☐ Erosion
☐ Fire	☐ Dumping or Mining
☐ Wind or ice damage	● ORV / vehicle disturbance
☐ Impoundment	☐ Trails / roads
☐ Exotic plants	☐ Other, list

List disturbance(s): to what degree have these altered natural ecological processes, and/or do they appear to effect the population?
The surrounding area has been heavily logged, and is not dominated by regenerating spruce stands. The Jack Pine forest is primarily younger trees (<10 dbh), and in the past likely extended into another stand of Jack Pine approximately 500 ft to the west (See JACKPINE WOOD005DMC).

- ☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor).
- ☐ **B** – Some signs of human disturbance or degradation, but community generally intact.
- ● **C** – Signs of human disturbance or degradation, community compromised in some significant way.
- ☐ **D** – Highly disturbed (multiple impacts causing community to be drastically altered).

2. SIZE / QUALITY:

What is the approximate size of the community occurrence?_____2.8 acres_____ ● acres / ☐ hectares

☐ Covers the natural extent of this community type ● Has been truncated through adjacent land use

Size / Quality Rank: ☐ **A** – Excellent ☐ **B** – Good ● **C** – Fair ☐ **D** – Poor

3. LANDSCAPE CONTEXT of the area surrounding the community:

What land uses and/or natural communities surround the observed area? Describe the types and extent of anthropogenic disturbance **around** the observed area, and to what degree this may affect the observed community. To what degree can the observed community be protected from effects of adjacent land uses?

Upwards of 80% of the surrounding community has been directly impacted from logging activities. To the north, east and west, recent activities have cleared the pre-existing forest terrain, and the area is regenerating with mixed conifers, mainly spruce. To the south the Jack pine forest extends outside the survey area. From aerial imagery it appears the entire stand may encompass approximately 6 acres, though less than 3 acres is located within the project's survey area.

- ☐ **A** – Community surrounded by >= 1000 acres of undisturbed landscape.
- ☐ **B** – Community surrounded by fairly intact landscape, though there may be cuts nearby.
- ● **C** – Community surrounded by fragmented forest or rural landscape.
- ☐ **D** – Surrounding area developed.

OVERALL RANK for Community based on your experience ☐ **A** – Excellent ☐ **B** – Good ● **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank		☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant
Date:	Reviewer:	Rationale:

PART II (con't): VEGETATION DATA from PLOT SAMPLING (replacing spp lists on p. 2, in cases where plots are taken)

Community type:			EOnum:
LAYER	plot #		
TREE list species and dbh for all trees >= 10 cm dbh; *count standing dead as 1 species.* **note units:** QUAD SIZE: **note which size used** 5.64 m radius for 1/100th ha 7.98 m radius for 2/100th ha use same size throughout!			
DEADWOOD (use tree plot) LARGE: (> 10cm dia); measure length in plot & middle dia): LIST DOM. SPP (IF KNOWN) SMALL (< 10 cm diameter): **1**: < 5% **2**: 6-24% **3**: 25%+			
SAPLING cover class by species of: trees/shrubs > 3 m tall but < 10 cm dbh; PLOT SIZE: 2.8 m radius			
SHRUB cover class by species of woodies > 1 m tall but < 3 m tall; PLOT SIZE: 2.8 m radius			
HERB cover class* by species for all herbaceous plants plus any woodies < 1 m tall QUAD SIZE: 1 m^2 , 4 herb quads per tree plot. Enter individual cover values in right-hand columns Remember the zeros for spp present in some but not all herb quads.	*Species*	*Species*	*Species*
BRYOID ground-layer mosses, liverwort, lichens in herb quads. **resolution** (check one): __"moss"/"liverwort"/"lichen" only; __identified to major group ("peat mosses, broom mosses, feather mosses", etc.); __identified to genus; __identified to species.			
REMARKS:			

In box on p.3, list plant spp. present in the community but not in the sample plots so we have a complete species list.

* cover classes (record midpoint): < 2 **1** 2-5% **3** 6-12% **9** 13-24% **19** 25-49% **37** 50-74% **63** 75-100% **87**

Please send completed form to: Information Manager, Maine Natural Areas Program, State House Station #93, Augusta, ME 04330

NATURAL COMMUNITY SURVEY

Project New England Clean Energy Connect (NECEC)

I. IDENTIFIERS / LOCATION

Site Name: NECEC FID #11	**Obs. Pt. #: JACKPINEWOOD005DMC**	**Quadcode:**
Field-assigned Community Type: Jack Pine Forest Identification or classification difficulties? Describe: No issues with identification		USGS 7.5' Quad Name: Spencer Lake Quadrangle Town: Bradstreet Township T4 R7
MNAP REVIEWED/EdITED TYPE:	Occurrence #:	County: Somerset
LANDOWNER INFORMATION: for each landowner Map / Lot / Name (& address if new landowner)		Date: 7/18/18 Surveyors: Duane Choquette & Tom Errico SourceCode: F_____ Biophysical Region: Western Mountains

GPS Coordinates (**X**☐ NAD 83, UTM Zone 19N; ☐ Other-please specify) centerpoint Lat: 45.49638, Long: -70.25782

Directions to occurrence: From the Town of Jackman, Maine: Take State Route 201 south to Spencer Road. Spencer Road west to Moore Pond, Proceed north to Egg Pond. Jack Pine woodland is west-northwest of Egg pond, between egg pond and Bitter Brook.

● Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

FEATURE MAP. Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation. Locational uncertainty refers to any uncertainty there is as to where the actual observation occurred. Confidence extent indicates how confident you are that the observed area represents the full extent of the feature.

Locational Uncertainty:None

☐ Areal delimited

● Mapped to within 12.5 m of actual location

☐ Greater uncertainty (please indicate)

_____50_____ m / ft / km / miles

Confidence Extent:

☐ **Y** - Confident full extent of feature **IS** known

● **N** - Confident full extent is **NOT** known

☐ **?** - **Uncertain** whether full extent is known

GENERAL DESCRIPTION OF COMMUNITY(See instructions for guidelines):

Predominately Jack pine (90%), with mixed red pine and red spruce in the canopy. The understory is dry and open, with lowbush blueberries, laurels, and snowberries found sporadically in patches, with bracken fern present in areas where the canopy thins. The Jack Pine woodland abuts regenerating clear-cuts to both the east and west, which are dominated by young red spruce, though scattered young jack pines can be found throughout.

SAMPLE TYPE:	Additional sampling recommended?
____ Brief descriptive – **NOT SUFFICIENT FOR DOCUMENTING NEW EOs**	X Yes ☐ No
__X__ Generalized cover estimates & dbhs (p2)	Photos: X Yes ☐ No
____ Nested plot samples (N = _____) (attach)	

II. VEGETATION BY STRATA

Community name & EO#:

TREE LAYER (canopy plus emergents, everything ≥ 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% **70%** 80% 90+%

Total Basal Area: ft²/acre | Conifer %:100 | Canopy height _60ft_____ m or ft Supercanopy spp?

Species name/code	Cover class*	Dbh range ☐in ☐ cm	Core ages	Species name/code	Cover class*	Dbh range ☐in ☐cm	Core ages	☐ check here if plot data are attached instead
Pinus banksiana	87	8-10						
Pinus strobus	1	8-10						
Picea rubens	9	6-8						
Pinus resinosa	1	6-8						

SAPLING / TALL SHRUB LAYER (> 3 m tall and < 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Picea rubens	19			
Pinus banksiana	63			

SHRUB LAYER (woody plants ~1 - 3 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Kalmia angustifolia	19			
Vaccinium angustifolium	19			

HERB / DWARF SHRUB LAYER (all herbaceous vascular plants plus any woody plants < 1 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE : tree regen___10_____%; shrub__10_____%; graminoid____0____%; forb___20____%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Pteridium aquilinum	37			
Gaultheria procumbens	19			
Cornus canadensis	19			
Gaultheria hispidula	9			

BRYOID LAYER (all ground-layer non-vascular plants; do not include epiphytes)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE: bryophytes__100_____% lichens _____%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Pleurozium schreberi	87			
Huperzia lucidula	9			

*cover classes (**midpoint**): < 2%= **1**, 2-5%= **3**, 6-12%= **9**, 13-24%= **19**, 25-49%= **37**, 50-74%= **63**, 75-100%= **87**

ADDITIONAL SPECIES within area where vegetation cover by strata were taken						OTHER PLANT SPP seen in community (spp codes), for complete plant species list
Stratum	Species code	Cover class	Stratum	Species code	Cover class	

III. ENVIRONMENTAL SETTING

Community name & EO#:

SOILS (rooting zone):

Sample #__005__

Depth to which soil examined___36 cm_____

Organic layer depth_____15_____cm or ☐ >1 m

Mineral layer below organic? ____yes___depth___21 cm_____

Mottling in top 30 cm?___No____depth_____

Depth to water table:__unknown_____

Depth to obstruction:__36 cm_____ nature of obstruction:____bedrock_____

Stoniness: ☐ very little (<1%)/ ● moderate (2-25%)/ ☐ very (>25%)

pH:__unknown_____ measured in ☐ soil or ☐ interstitial water

vonPost decomposition (peat substrates only) _____ at _____ deep

ELEVATION:1250ft

☐ m or ● ft?

ASPECT (TRUE): South

SLOPE : Include units! (45º = 100%)

10% = 25%

☐ measured ● estimated

HYDROLOGIC REGIME:

☐ upland

☐ nontidal wetland:
- ☐ perm flooded
- ☐ semiper flooded
- ☐ seasonally fld.
- ☐ saturated

☐ tidal – irreg. fld.
☐ tidal – reg. fld.
- ☐ saltwater
- ☐ brackish
- ☐ freshwater

☐ unknown

HABITAT PATCHINESS (describe zones or patches if present):

Dense central stand, outer edges border logging clearcuts with regenerating spuce being dominant.

MICROTOPOGRAPHY:

Jack Pine Forest is surrounded by regenerating clear cuts on West, North and East sides. A depression containing a Black spruce bog is located within the Jack Pine forest along the southern survey limit.

AVERAGE TEXTURE:

☐ gravel
☐ sand
● loamy sand / sandy loam
☐ loam
☐ silt loam
☐ clay loams
☐ sandy clay / clay
☐ peat
☐ muck

DRAINAGE & MOISTURE REGIME (see MAPPSS key):

☐ very poorly drained
☐ poorly drained
☐ somewhat poorly drained
☐ moderately well drained
☐ well drained
☐ somewhat excessively drained
☐ excessively drained

BEDROCK TYPE:

☐ Igneous
- ● granite
- ☐ dioritic
- ☐ gabbroic

☐ Metamorphic
- ☐ slate/phyllite
- ☐ schist/gneiss

☐ Sedimentary
- ☐ limestone
- ☐ other

details?

TOPOGRAPHIC POSITION

☐ D drainage channel
☐ P low plain, level
☐ N narrow valley
☐ T toe of slope
☐ L lower slope
● M middle slope
☐ T hillside terrace
☐ U upper slope
☐ E cliff/ledge
☐ S ridge, summit, crest

SURFICIAL DEPOSIT:

● bedrock
☐ talus slope
☐ glacial till
☐ moraine
☐ esker/outwash
☐ glacial delta
☐ lacustrine/fluvial
☐ marine
☐ aeolian
☐ other:

THREATS TO COMMUNITY? Logging

MANAGEMENT / PROTECTION NEEDS?

OTHER COMMENTS: animal use, species distribution notes, etc.
This Jack Pine Forest is located approximately 1500 ft west-northwest of Egg Pond, and extends both north and south from the survey area. In the Southern segment, the Jack Pine Forest surrounds a large depression containing a Black Spruce bog. Heavy logging has occurred to the east and west of the Jack Pine Forest, and scattered jack pine saplings can be found in these regenerating clear-cuts. The clear cuts are spruce dominant.

IV. SUMMARY AND RANKING

Community name & EO#:

Applicable National Type:	NVC CODE: CEGL00_____	Comment re fit to type?

COMMUNITY RANKING

1. CURRENT CONDITION and quality of the community itself.

- Comment on the species composition and biological structure of the community (species diversity, indicator species, development/maturity, etc.) For forests: Do you consider this to be old growth? If so, based on what?

- Natural and anthropogenic disturbance **within** the community (check off, then describe extent and how recent below)

☒ Logging – most recently c. __20+_____ yrs ago	☐ Animal effects (insect outbreaks, browsing)
☐ Agriculture / pasture	☐ Erosion
☐ Fire	☐ Dumping or Mining
☐ Wind or ice damage	☒ ORV / vehicle disturbance
☐ Impoundment	☒ Trails / roads
☐ Exotic plants	☐ Other, list

List disturbance(s): to what degree have these altered natural ecological processes, and/or do they appear to effect the population?
The surrounding area has been heavily logged, and is not dominated by regenerating spruce stands. The Jack Pine forest is primarily younger trees (<10 dbh), and in the past likely extended into another stand of Jack Pine approximately 500 ft to the west (See JACKPINE WOOD004DMC).

- ☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor).
- ☐ **B** – Some signs of human disturbance or degradation, but community generally intact.
- ☒ **C** – Signs of human disturbance or degradation, community compromised in some significant way.
- ☐ **D** – Highly disturbed (multiple impacts causing community to be drastically altered).

2. SIZE / QUALITY:

What is the approximate size of the community occurrence?_____4.7 acres_____ ☒ acres / ☐ hectares

☐ Covers the natural extent of this community type ☒ Has been truncated through adjacent land use

Size / Quality Rank: ☐ **A** – Excellent ☐ **B** – Good ☒ **C** – Fair ☐ **D** – Poor

3. LANDSCAPE CONTEXT of the area surrounding the community:

What land uses and/or natural communities surround the observed area? Describe the types and extent of anthropogenic disturbance **around** the observed area, and to what degree this may affect the observed community. To what degree can the observed community be protected from effects of adjacent land uses?

Upwards of 80% of the surrounding community has been directly impacted from logging activities. To the north, east and west, recent activities have cleared the pre-existing forest terrain, and the area is regenerating with mixed conifers, mainly spruce. To the south the Jack pine forest extends outside the survey area. From aerial imagery it appears the entire stand may encompass approximately 20 acres, though less than 5 acres is located within the project's survey area.

- ☐ **A** – Community surrounded by >= 1000 acres of undisturbed landscape.
- ☒ **B** – Community surrounded by fairly intact landscape, though there may be cuts nearby.
- ☐ **C** – Community surrounded by fragmented forest or rural landscape.
- ☐ **D** – Surrounding area developed.

OVERALL RANK for Community based on your experience ☐ **A** – Excellent ☐ **B** – Good ☒ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank		☐ **A** – Excellent	☐ **B** – Good	☐ **C** – Fair	☐ **D** – Poor	☐ **E** – Extant
Date:	Reviewer:	Rationale:				

PART II (con't): VEGETATION DATA from PLOT SAMPLING (replacing spp lists on p. 2, in cases where plots are taken)

Community type:			EOnum:
LAYER	plot #		
TREE list species and dbh for all trees >= 10 cm dbh; *count standing dead as 1 species.* **note units:** QUAD SIZE: **note which size used** 5.64 m radius for 1/100th ha 7.98 m radius for 2/100th ha use same size throughout!			
DEADWOOD (use tree plot) LARGE: (> 10cm dia); measure length in plot & middle dia): LIST DOM. SPP (IF KNOWN) SMALL (< 10 cm diameter): **1**: < 5% **2**: 6-24% **3**: 25%+			
SAPLING cover class by species of: trees/shrubs > 3 m tall but < 10 cm dbh; PLOT SIZE: 2.8 m radius			
SHRUB cover class by species of woodies > 1 m tall but < 3 m tall; PLOT SIZE: 2.8 m radius			
HERB cover class* by species for all herbaceous plants plus any woodies < 1 m tall QUAD SIZE: 1 m^2 , 4 herb quads per tree plot. Enter individual cover values in right-hand columns Remember the zeros for spp present in some but not all herb quads.	*Species*	*Species*	*Species*
BRYOID ground-layer mosses, liverwort, lichens in herb quads. **resolution** (check one): __"moss"/"liverwort"/"lichen" only; __identified to major group ("peat mosses, broom mosses, feather mosses", etc.); __identified to genus; __identified to species.			
REMARKS:			

In box on p.3, list plant spp. present in the community but not in the sample plots so we have a complete species list.

* cover classes (record midpoint): < 2 **1** 2-5% **3** 6-12% **9** 13-24% **19** 25-49% **37** 50-74% **63** 75-100% **87**

Please send completed form to: Information Manager, Maine Natural Areas Program, State House Station #93, Augusta, ME 04330

I. IDENTIFIERS / LOCATION

Site Name: NECEC FID #12	**Obs. Pt. #: JACKPINEWOOD006DMC**	**Quadcode:**
Field-assigned Community Type: Jack Pine Forest Identification or classification difficulties? Describe: No issues with identification		USGS 7.5' Quad Name: Enchanted Pond Quadrangle Town: Bradstreet Township T4 R7
MNAP REVIEWED/EdITED TYPE:	Occurrence #:	County: Somerset
LANDOWNER INFORMATION: for each landowner Map / Lot / Name (& address if new landowner)		Date: 7/18/18 Surveyors: Duane Choquette & Tom Errico SourceCode: F_____ Biophysical Region: Western Mountains

GPS Coordinates (**X**☐ NAD 83, UTM Zone 19N; ☐ Other-please specify) centerpoint Lat: 45.49638, Long: -70.25782

Directions to occurrence: From the Town of Jackman, Maine: Take State Route 201 south to Spencer Road. Spencer Road approximately 7 miles west. Turn north onto logging road and bear left. The road ends in a log landing at the start of the Jack Pone Forest. Proceed west into the Jack pine Forest.

● Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

FEATURE MAP. Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation. Locational uncertainty refers to any uncertainty there is as to where the actual observation occurred. Confidence extent indicates how confident you are that the observed area represents the full extent of the feature.

Locational Uncertainty:None

☐ Areal delimited

● Mapped to within 12.5 m of actual location

☐ Greater uncertainty (please indicate)

_____50_____ m / ft / km / miles

Confidence Extent:

☐ **Y** - Confident full extent of feature **IS** known

● **N** - Confident full extent is **NOT** known

☐ **?** - **Uncertain** whether full extent is known

GENERAL DESCRIPTION OF COMMUNITY(See instructions for guidelines):

Predominately Jack pine (70%), with mixed red pine, red spruce, and balsam fir in the canopy. The understory is dry and open, with brackenfern and bunchberry found throughout. The Jack Pine Forest is fairly extensive, extending outside of the survey area to the north and south. The Forest also spans a large alder-dominant stream valley and two smaller wetland seeps. The Jack Pine gives way to a spruce and fir dominant forest to the south. Sugar maples saplings appear sporadically in the understory in the western edge of the Jack Pine Forest.

SAMPLE TYPE:	Additional sampling recommended?
____ Brief descriptive – **NOT SUFFICIENT FOR DOCUMENTING NEW EOs**	X Yes ☐ No
__X__ Generalized cover estimates & dbhs (p2)	Photos: X Yes ☐ No
____ Nested plot samples (N = _____) (attach)	

II. VEGETATION BY STRATA

Community name & EO#:

TREE LAYER (canopy plus emergents, everything ≥ 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% **70%** 80% 90+%

Total Basal Area: ft²/acre | Conifer %:100 | Canopy height _80ft_____ m or ft | Supercanopy spp?

Species name/code	Cover class*	Dbh range ☐in ☐ cm	Core ages	Species name/code	Cover class*	Dbh range ☐in ☐cm	Core ages	☐ check here if plot data are attached instead
Pinus banksiana	87	10-14						
Pinus strobus	3	12-16						
Picea rubens	19	8-10						
Abies balsamea	9							

SAPLING / TALL SHRUB LAYER (> 3 m tall and < 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Picea rubens	19			
Pinus banksiana	37			
Abies balsamea	19			

SHRUB LAYER (woody plants ~1 - 3 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Kalmia angustifolia	3			
Vaccinium angustifolium	3			

HERB / DWARF SHRUB LAYER (all herbaceous vascular plants plus any woody plants < 1 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE : tree regen___10_____%; shrub__10_____%; graminoid____0____%; forb___20____%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Pteridium aquilinum	37			
Gaultheria procumbens	19			
Cornus canadensis	37			
Gaultheria hispidula	9			

BRYOID LAYER (all ground-layer non-vascular plants; do not include epiphytes)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE: bryophytes__100_____% lichens _____%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Pleurozium schreberi	87			
Huperzia lucidula	9			

*cover classes (**midpoint**): < 2%= **1**, 2-5%= **3**, 6-12%= **9**, 13-24%= **19**, 25-49%= **37**, 50-74%= **63**, 75-100%= **87**

ADDITIONAL SPECIES within area where vegetation cover by strata were taken

Stratum	Species code	Cover class	Stratum	Species code	Cover class

OTHER PLANT SPP seen in community (spp codes), for complete plant species list

III. ENVIRONMENTAL SETTING

Community name & EO#:

SOILS (rooting zone):

Sample #__006__

Depth to which soil examined___45 cm_____

Organic layer depth_____18_____cm or ☐ >1 m

Mineral layer below organic? ____yes___depth___27 cm_____

Mottling in top 30 cm?___No____depth_____

Depth to water table:__unknown_____

Depth to obstruction:__None_encountered_____ nature of obstruction:____ _____

Stoniness: ☐ very little (<1%)/ ● moderate (2-25%)/ ☐ very (>25%)

pH:__unknown_____ measured in ☐ soil or ☐ interstitial water

vonPost decomposition (peat substrates only) _____ at _____ deep

ELEVATION:1240ft

☐ m or ● ft?

ASPECT (TRUE): northwest

SLOPE : Include units! (45º = 100%)

10% = 25%

☐ measured ● estimated

HYDROLOGIC REGIME:

● upland

☐ nontidal wetland:
- ☐ perm flooded
- ☐ semiper flooded
- ☐ seasonally fld.
- ● saturated

☐ tidal – irreg. fld.
☐ tidal – reg. fld.
- ☐ saltwater
- ☐ brackish
- ● freshwater

☐ unknown

Stream valley and seepage wetlands within Forest.

HABITAT PATCHINESS (describe zones or patches if present):

Large Jack Pine stand located between Horse Brook and one of its tributaries to the east. The Jack pine Forest convert to a spruce and fir forest to the south, and a spruce, fir and sugar maple forest to the west.

MICROTOPOGRAPHY:

Jack Pine Forest is mid-slope on a northwestern facing hillside, and descends in elevation on both the eastern and western sides as it descends into stream valleys.

AVERAGE TEXTURE:

- ☐ gravel
- ☐ sand
- ● loamy sand / sandy loam
- ☐ loam
- ☐ silt loam
- ☐ clay loams
- ☐ sandy clay / clay
- ☐ peat
- ☐ muck

DRAINAGE & MOISTURE REGIME (see MAPPSS key):

- ☐ very poorly drained
- ☐ poorly drained
- ☐ somewhat poorly drained
- ☐ moderately well drained
- ☐ well drained
- ☐ somewhat excessively drained
- ☐ excessively drained

BEDROCK TYPE:

☐ Igneous
- ● granite
- ☐ dioritic
- ☐ gabbroic

☐ Metamorphic
- ☐ slate/phyllite
- ☐ schist/gneiss

☐ Sedimentary
- ☐ limestone
- ☐ other

details?

TOPOGRAPHIC POSITION

- ☐ D drainage channel
- ☐ P low plain, level
- ☐ N narrow valley
- ☐ T toe of slope
- ☐ L lower slope
- ● M middle slope
- ☐ T hillside terrace
- ☐ U upper slope
- ☐ E cliff/ledge
- ☐ S ridge, summit, crest

SURFICIAL DEPOSIT:

- ● bedrock
- ☐ talus slope
- ☐ glacial till
- ☐ moraine
- ☐ esker/outwash
- ☐ glacial delta
- ☐ lacustrine/fluvial
- ☐ marine
- ☐ aeolian
- ☐ other:

THREATS TO COMMUNITY? Logging

MANAGEMENT / PROTECTION NEEDS?

OTHER COMMENTS: animal use, species distribution notes, etc.
This community is located on triangular swath of habitat bounded on the south by a spruce/fir forest bordering Spencer Road, the northwestern side by Horde Brook and on the northeastern side by an unnamed tributary of Horse Brook. The site drain northward and into the Moose river.

IV. SUMMARY AND RANKING

Community name & EO#:

Applicable National Type:	NVC CODE: CEGL00_____	Comment re fit to type?

COMMUNITY RANKING

1. CURRENT CONDITION and quality of the community itself.

- Comment on the species composition and biological structure of the community (species diversity, indicator species, development/maturity, etc.) For forests: Do you consider this to be old growth? If so, based on what?

- Natural and anthropogenic disturbance **within** the community (check off, then describe extent and how recent below)

● Logging – most recently c. __30+_____ yrs ago	☐ Animal effects (insect outbreaks, browsing)
☐ Agriculture / pasture	☐ Erosion
☐ Fire	☐ Dumping or Mining
☐ Wind or ice damage	● ORV / vehicle disturbance
☐ Impoundment	☐ Trails / roads
☐ Exotic plants	☐ Other, list

List disturbance(s): to what degree have these altered natural ecological processes, and/or do they appear to effect the population?
The surrounding area has been heavily logged, and is not dominated by regenerating spruce stands. The Jack Pine forest is primarily younger trees (<10 dbh), and in the past likely extended into another stand of Jack Pine approximately 500 ft to the west (See JACKPINE WOOD005DMC).

- ☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor).
- ☐ **B** – Some signs of human disturbance or degradation, but community generally intact.
- ● **C** – Signs of human disturbance or degradation, community compromised in some significant way.
- ☐ **D** – Highly disturbed (multiple impacts causing community to be drastically altered).

2. SIZE / QUALITY:

What is the approximate size of the community occurrence?_____11.4 acres_____ ● ☐ acres / ☐ hectares

☐ Covers the natural extent of this community type ● ☐ Has been truncated through adjacent land use

Size / Quality Rank: ☐ **A** – Excellent ● ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor

3. LANDSCAPE CONTEXT of the area surrounding the community:

What land uses and/or natural communities surround the observed area? Describe the types and extent of anthropogenic disturbance **around** the observed area, and to what degree this may affect the observed community. To what degree can the observed community be protected from effects of adjacent land uses?

This natural community is located between two large stream valleys. Logging activities have heavily impacted the surrounding area, but a large contingent of Jack Pine Forest remains. To the south the Jack pine forest extends outside the survey area.

- ☐ **A** – Community surrounded by >= 1000 acres of undisturbed landscape.
- ● ☐ **B** – Community surrounded by fairly intact landscape, though there may be cuts nearby.
- ☐ **C** – Community surrounded by fragmented forest or rural landscape.
- ☐ **D** – Surrounding area developed.

OVERALL RANK for Community based on your experience ☐ **A** – Excellent ☐ **B** – Good ● ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank		☐ **A** – Excellent	☐ **B** – Good	☐ **C** – Fair	☐ **D** – Poor	☐ **E** – Extant
Date:	Reviewer:	Rationale:				

PART II (con't): VEGETATION DATA from PLOT SAMPLING (replacing spp lists on p. 2, in cases where plots are taken)

Community type:			EOnum:
LAYER	plot #		
TREE list species and dbh for all trees >= 10 cm dbh; *count standing dead as 1 species.* **note units:** QUAD SIZE: **note which size used** 5.64 m radius for 1/100th ha 7.98 m radius for 2/100th ha use same size throughout!			
DEADWOOD (use tree plot) LARGE: (> 10cm dia); measure length in plot & middle dia): LIST DOM. SPP (IF KNOWN) SMALL (< 10 cm diameter): **1**: < 5% **2**: 6-24% **3**: 25%+			
SAPLING cover class by species of: trees/shrubs > 3 m tall but < 10 cm dbh; PLOT SIZE: 2.8 m radius			
SHRUB cover class by species of woodies > 1 m tall but < 3 m tall; PLOT SIZE: 2.8 m radius			
HERB cover class* by species for all herbaceous plants plus any woodies < 1 m tall QUAD SIZE: 1 m^2 , 4 herb quads per tree plot. Enter individual cover values in right-hand columns Remember the zeros for spp present in some but not all herb quads.	*Species*	*Species*	*Species*
BRYOID ground-layer mosses, liverwort, lichens in herb quads. **resolution** (check one): __"moss"/"liverwort"/"lichen" only; __identified to major group ("peat mosses, broom mosses, feather mosses", etc.); __identified to genus; __identified to species.			
REMARKS:			

In box on p.3, list plant spp. present in the community but not in the sample plots so we have a complete species list.

* cover classes (record midpoint): < 2 **1** 2-5% **3** 6-12% **9** 13-24% **19** 25-49% **37** 50-74% **63** 75-100% **87**

Please send completed form to: Information Manager, Maine Natural Areas Program, State House Station #93, Augusta, ME 04330

NATURAL COMMUNITY SURVEY

Project _____

I. IDENTIFIERS / LOCATION

Site Name: Livermore Falls Upper Floodplain Hardwood Forest	**Obs. Pt. #:**	**Quadcode:**
Field-assigned Community Type: Upper Floodplain Hardwood Forest Identification or classification difficulties? Describe: Does not completely comport with description, although topographic position is appropriate, and the site is hardwood dominated.		USGS 7.5' Quad Name: Livermore Falls Town: Livermore Falls
MNAP REVIEWED/EdITED TYPE:	Occurrence #:	County: Androscoggin
LANDOWNER INFORMATION: for each landowner Map | Lot | Name (& address if new landowner)		Date: 7/7/18 Surveyors: A. Gilman SourceCode: F_____ Biophysical Region:

GPS Coordinates (☒ NAD 83, UTM Zone 19N; ☐ Other-please specify) Lat. 44.403416, Long. -70.148538

Directions to occurrence:

☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

FEATURE MAP. Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation. Locational uncertainty refers to any uncertainty there is as to where the actual observation occurred. Confidence extent indicates how confident you are that the observed area represents the full extent of the feature.

Locational Uncertainty:

☐ Areal delimited

☐ Mapped to within 12.5 m of actual location

☐ Greater uncertainty (please indicate)

_____50_____ m / ft / km / miles

Confidence Extent:

☐ **Y** - Confident full extent of feature **IS** known

☐ **N** - Confident full extent is **NOT** known

☐ **?** - **Uncertain** whether full extent is known

GENERAL DESCRIPTION OF COMMUNITY(See instructions for guidelines):

The community is dominated by red oak, yellow birch, white ash, and red maple, with minor component of black cherry. "Rich forest" components" such as sugar maple and basswood are not importantly represented but note the presence of at least oe butternut tree. (Also note the lack of silver maple or cottonwood). Many trees are of large size (ca.14" – 16") and there is good forest structure. Shrubs are nearly lacking (a few speckled alder). The understory comprises mainly ferns: Sensitive fern, interrupted fern, and lady fern are most prominent, with a few ostrich fern present.

The site is nearly level and the community occurs slightly up-gradient and down-gradient of the delineated wetland boundary. Slightly to the south a stream enters from the east, and the canopy opens to a high-herb streamside community. Beyond that, there is general floodplain forest. To the north, the community is bounded by rising terrain and mixed forest on sand deposits.

The community was not investigate further west (towards River Road) than the NENEC project study area. Note this area was previously mapped (by the same investigator) as "maple-basswood floodplain forest" but basswood is now not apparent.

SAMPLE TYPE:	Additional sampling recommended?
__X__ Brief descriptive – **NOT SUFFICIENT FOR DOCUMENTING NEW EOs** ____ Generalized cover estimates & dbhs (p2) ____ Nested plot samples (N = _____) (attach)	☐ Yes ☐ No Photos: ☐ Yes ☐ No

II. VEGETATION BY STRATA

Community name & EO#:

TREE LAYER (canopy plus emergents, everything ≥ 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Total Basal Area: ft²/acre NC

Conifer %:0

Canopy height ____40___m or ft

Supercanopy spp? No

Species name/code	Cover class*	Dbh range ☒in ☐cm	Core ages	Species name/code	Cover class*	Dbh range ☐in ☐cm	Core ages
Querus rubra	19	12”-16”+	NA				
Betula allegh	19	12”-16”	NA				
Acer rubrum	37	10”-15”	NA				

☐ **check here if plot data are attached instead**

SAPLING / TALL SHRUB LAYER (> 3 m tall and < 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*
NA			

check here if plot data are attached instead ☐

SHRUB LAYER (woody plants ~1 - 3 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*
NA			

check here if plot data are attached instead ☐

HERB / DWARF SHRUB LAYER (all herbaceous vascular plants plus any woody plants < 1 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE : tree regen_____%; shrub_____%; graminoid____0____%; forb___75____%

Species name/code	Cover class*	Species name/code	Cover class*
Onoclea sensibilis	19		
Athyrium angustum	19		
Osumnda claytoniana	19		
		No spring ephemerals were observed due to mid-summer site visit.	

check here if plot data are attached instead ☐

BRYOID LAYER (all ground-layer non-vascular plants; do not include epiphytes)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE: bryophytes_____<5%____% lichens ____0____%

Species name/code	Cover class*	Species name/code	Cover class*
No observed			

check here if plot data are attached instead ☐

*cover classes (**midpoint**): < 2%= **1**, 2-5%= **3**, 6-12%= **9**, 13-24%= **19**, 25-49%= **37**, 50-74%= **63**, 75-100%= **87**

ADDITIONAL SPECIES within area where vegetation cover by strata were taken						OTHER PLANT SPP seen in community (spp codes), for complete plant species list
Stratum	Species code	Cover class	Stratum	Species code	Cover class	**Dryopteris carthusiana**

III. ENVIRONMENTAL SETTING

Community name & EO#:

SOILS (rooting zone):

Sample #____

Depth to which soil examined____NA (soils not examined)____

Organic layer depth_____cm or ☐ >1 m

Mineral layer below organic? _____depth_____

Mottling in top 30 cm?_____depth_____

Depth to water table:_____

Depth to obstruction:_____ nature of obstruction:_____

Stoniness: ☐ very little (<1%)/ ☐ moderate (2-25%)/ ☐ very (>25%)

pH:_____ measured in ☐ soil or ☐ interstitial water

vonPost decomposition (peat substrates only) _____ at _____ deep

AVERAGE TEXTURE:

- ☐ gravel
- ☐ sand
- ☐ loamy sand / sandy loam
- ☐ loam
- ☐ silt loam
- ☐ clay loams
- ☐ sandy clay / clay
- ☐ peat
- ☐ muck

DRAINAGE & MOISTURE REGIME (see MAPPSS key):

- ☐ very poorly drained
- ☐ poorly drained
- ☐ somewhat poorly drained
- ☐ moderately well drained
- ☐ well drained
- ☐ somewhat excessively drained
- ☐ excessively drained

ELEVATION: 290 ft

☐ m or ☒ ft?

ASPECT (TRUE):

SLOPE : Include units! (45º = 100%)

0%-2%, estimated

☐ measured ☒ estimated

HYDROLOGIC REGIME:

- ☒ upland
- ☒ nontidal wetland:
  - ☐ perm flooded
  - ☐ semiper flooded
  - ☒ seasonally fld.
  - ☐ saturated
- ☐ tidal – irreg. fld.
- ☐ tidal – reg. fld.
  - ☐ saltwater
  - ☐ brackish
  - ☐ freshwater
- ☐ unknown

HABITAT PATCHINESS (describe zones or patches if present): Fairly uniform

MICROTOPOGRAPHY: NA

BEDROCK TYPE:

- ☐ Igneous
  - ☐ granite
  - ☐ dioritic
  - ☐ gabbroic
- ☐ Metamorphic
  - ☐ slate/phyllite
  - ☐ schist/gneiss
- ☐ Sedimentary
  - ☐ limestone
  - ☐ other

details? Limy marine shale

TOPOGRAPHIC POSITION

- ☐ D drainage channel
- ☒ P low plain, level
- ☐ N narrow valley
- ☐ T toe of slope
- ☐ L lower slope
- ☐ M middle slope
- ☐ T hillside terrace
- ☐ U upper slope
- ☐ E cliff/ledge
- ☐ S ridge, summit, crest

SURFICIAL DEPOSIT:

- ☐ bedrock
- ☐ talus slope
- ☐ glacial till
- ☐ moraine
- ☐ esker/outwash
- ☐ glacial delta
- ☒ lacustrine/fluvial
- ☐ marine
- ☐ aeolian
- ☐ other:

THREATS TO COMMUNITY?

MANAGEMENT / PROTECTION NEEDS?

OTHER COMMENTS: animal use, species distribution notes, etc.

This community is a fairly small patch but is mature and has well-developed forest structure; there are few invasives.

IV. SUMMARY AND RANKING

Community name & EO#: Hardwood river terrace forest /Upper floodplain hardwood forest

Applicable National Type:	NVC CODE: CEGL00_____	Comment re fit to type?

COMMUNITY RANKING

1. CURRENT CONDITION and quality of the community itself.

- Comment on the species composition and biological structure of the community (species diversity, indicator species, development/maturity, etc.) For forests: Do you consider this to be old growth? If so, based on what?

  Not particularly enriched (no sugar maple, little basswood); nor particularly diverse (due to shading) but spring ephemeral community not assessed; not old growth although mature.

- Natural and anthropogenic disturbance **within** the community (check off, then describe extent and how recent below)

☐ Logging – most recently c. _____ yrs ago
☐ Agriculture / pasture
☐ Fire
☐ Wind or ice damage
☐ Impoundment
☐ Exotic plants
☐ Animal effects (insect outbreaks, browsing)
☐ Erosion
☐ Dumping or Mining
☐ ORV / vehicle disturbance
☐ Trails / roads
☐ Other, list: Adjacent powerline corridor; snowmobile trail, otherwise seems fairly intact.

List disturbance(s): to what degree have these altered natural ecological processes, and/or do they appear to effect the population?

☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor).
☐ **B** – Some signs of human disturbance or degradation, but community generally intact.
☐ **C** – Signs of human disturbance or degradation, community compromised in some significant way.
☐ **D** – Highly disturbed (multiple impacts causing community to be drastically altered).

2. SIZE / QUALITY:

What is the approximate size of the community occurrence?_____2-3_____ ☐ acres / ☐ hectares

☐ Covers the natural extent of this community type ☐ Has been truncated through adjacent land use

Size / Quality Rank: ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor

3. LANDSCAPE CONTEXT of the area surrounding the community:

What land uses and/or natural communities surround the observed area? Describe the types and extent of anthropogenic disturbance **around** the observed area, and to what degree this may affect the observed community. To what degree can the observed community be protected from effects of adjacent land uses?
Powerline; road (west); not fully assessed due to limited study area.

☐ **A** – Community surrounded by >= 1000 acres of undisturbed landscape.
☐ **B** – Community surrounded by fairly intact landscape, though there may be cuts nearby.
☐ **C** – Community surrounded by fragmented forest or rural landscape.
☐ **D** – Surrounding area developed.

OVERALL RANK for Community ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant
based on your experience
Comments: Small size, does not comport 100% with published description, not enriched.

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

PART II (con't): VEGETATION DATA from PLOT SAMPLING (replacing spp lists on p. 2, in cases where plots are taken)

Community type:			EOnum:
LAYER	plot #		
TREE list species and dbh for all trees >= 10 cm dbh; *count standing dead as 1 species.* **note units:** QUAD SIZE: **note which size used** 5.64 m radius for 1/100th ha 7.98 m radius for 2/100th ha use same size throughout!			
DEADWOOD (use tree plot) LARGE: (> 10cm dia); measure length in plot & middle dia): LIST DOM. SPP (IF KNOWN) SMALL (< 10 cm diameter): **1**: < 5% **2**: 6-24% **3**: 25%+			
SAPLING cover class by species of: trees/shrubs > 3 m tall but < 10 cm dbh; PLOT SIZE: 2.8 m radius			
SHRUB cover class by species of woodies > 1 m tall but < 3 m tall; PLOT SIZE: 2.8 m radius			
HERB cover class* by species for all herbaceous plants plus any woodies < 1 m tall QUAD SIZE: 1 m^2 , 4 herb quads per tree plot. Enter individual cover values in right-hand columns Remember the zeros for spp present in some but not all herb quads.	*Species*	*Species*	*Species*
BRYOID ground-layer mosses, liverwort, lichens in herb quads. **resolution** (check one): __"moss"/"liverwort"/"lichen" only; __identified to major group ("peat mosses, broom mosses, feather mosses", etc.); __identified to genus; __identified to species.			
REMARKS:			

In box on p.3, list plant spp. present in the community but not in the sample plots so we have a complete species list.

* cover classes (record midpoint): < 2 **1** 2-5% **3** 6-12% **9** 13-24% **19** 25-49% **37** 50-74% **63** 75-100% **87**

Please send completed form to: Information Manager, Maine Natural Areas Program, State House Station #93, Augusta, ME 04330

NATURAL COMMUNITY SURVEY

Project _____

I. IDENTIFIERS / LOCATION

Site Name: North Anson River Terrace Hardwood /Upper Floodplain Hardwood Forest	**Obs. Pt. #:**	**Quadcode:**
Field-assigned Community Type: As above Identification or classification difficulties? Describe: Does not completely comport with description, although topographic position is appropriate and the site is hardwood dominated.		USGS 7.5' Quad Name: Madison West Town: Anson
MNAP REVIEWED/EdITED TYPE:	Occurrence #:	County: Somerset
LANDOWNER INFORMATION: for each landowner Map | Lot | Name (& address if new landowner)		Date: 27 July 2018 Surveyors: A. V. Gilman SourceCode: F_____ Biophysical Region:

GPS Coordinates (☒ NAD 83, UTM Zone 19N; ☐ Other-please specify) Lat. 44.853352, Long. -69.886138

Directions to occurrence:
Park under CMP powerlines on Madison Street, north of the Carrabasset Stream, and follow powerlines S across an agricultural field (in corn in 2018) to riverside; community is on the W side of the powerlines between the cornfield and the river.

☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

FEATURE MAP. Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation. Locational uncertainty refers to any uncertainty there is as to where the actual observation occurred. Confidence extent indicates how confident you are that the observed area represents the full extent of the feature.

Locational Uncertainty:
- ☒ Areal delimited
- ☐ Mapped to within 12.5 m of actual location
- ☐ Greater uncertainty (please indicate)

_____50_____ m / ft / km / miles

Confidence Extent:
- ☐ **Y** - Confident full extent of feature **IS** known
- ☒ **N** - Confident full extent is **NOT** known
- ☐ **?** - **Uncertain** whether full extent is known

GENERAL DESCRIPTION OF COMMUNITY(See instructions for guidelines):

The community is on an upper terrace associated with Carrabasset Stream not for above its confluence with the Kennebec River (and likely back-flooded from the river at extremes). The riverside terrace is silver maple floodplain forest; this area is slightly upgradient and has a different community that is dominated by green ash and red oak with minor component of elm. The age structure is young except for a few large red oak and green ash. It is not an enriched community.

The forest is rather heavily invaded by invasive honeysuckles (much more so than when observed by the same surveyor in 2007); these comprise an understory of about 40%-50% cover overall. Understory herbs are typical, but lack elements of richness such as blue cohosh, wild leek, etc.

It is bounded south by silver maple floodplain forest, a narrow strip along river's edge (in the surveyor's judgement too narrow to consider as a natural community although containing some typically large trees). It is bounded north by cornfield

Note, as can be seen on aerial photos, the overall canopy is of small trees, vs. areas of larger trees upstream on the N side of the Carrabasset River.

SAMPLE TYPE:	Additional sampling recommended?
____ Brief descriptive – **NOT SUFFICIENT FOR DOCUMENTING NEW EOs** __X_ Generalized cover estimates & dbhs (p2) ____ Nested plot samples (N = _____) (attach)	☐ Yes ☒ No Photos: ☐ Yes ☐ No

II. VEGETATION BY STRATA

Community name & EO#:

TREE LAYER (canopy plus emergents, everything ≥ 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Total Basal Area: ft²/acre NC

Conifer %:0

Canopy height ____40'___m or ft
Supercanopy spp? 50', Quercus rubra

Species name/code	Cover class*	Dbh range ☒in ☐cm	Core ages	Species name/code	Cover class*	Dbh range ☐in ☐cm	Core ages
Quercus rubra	9	20"-24"					
Fraxinus penns	63	8"-14"					
Ulmus americana	9	3"-16"					
At field edge: one basswood, some black cherry; on slightly higher elevation.							

☐ **check here if plot data are attached instead**

SAPLING / TALL SHRUB LAYER (> 3 m tall and < 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*
Ulmus americana	3		
Fraxinus pensilvanica	3		

check here if plot data are attached instead ☐

SHRUB LAYER (woody plants ~1 - 3 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*
Lonicera cf. morrowii	37		

check here if plot data are attached instead ☐

HERB / DWARF SHRUB LAYER (all herbaceous vascular plants plus any woody plants < 1 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE : tree regen_____%; shrub_____%; graminoid____0____%; forb___75____%

Species name/code	Cover class*	Species name/code	Cover class*
Onoclea sensibilis	19	Rosa multiflora	1
Athyrium angustum	3		
Matteuccia struthiopteris	9	Note absence: cinnamon fern,	
Circaea canadensis	1	Interrupted fern	
Viola pensylvanica	1		
Solidago flexicaulis	1		
Geum canadense	1		
Carex cf. blanda	1		
		No spring ephemerals were observed due to mid-summer site visit.	

check here if plot data are attached instead ☐

BRYOID LAYER (all ground-layer non-vascular plants; do not include epiphytes)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE: bryophytes_____<5%____% lichens ____0____%

Species name/code	Cover class*	Species name/code	Cover class*
None observed			

check here if

				plot data are attached instead ☐

*cover classes (**midpoint**): < 2%= **1**, 2-5%= **3**, 6-12%= **9**, 13-24%= **19**, 25-49%= **37**, 50-74%= **63**, 75-100%= **87**

ADDITIONAL SPECIES within area where vegetation cover by strata were taken

Stratum	Species code	Cover class	Stratum	Species code	Cover class

OTHER PLANT SPP seen in community (spp codes), for complete plant species list

Black cherry

III. ENVIRONMENTAL SETTING

Community name & EO#:

SOILS (rooting zone):

Sample #____

Depth to which soil examined____NA (soils not examined)____

Organic layer depth_____cm or ☐ >1 m

Mineral layer below organic? _____depth_____

Mottling in top 30 cm?_____depth_____

Depth to water table:_____

Depth to obstruction:_____ nature of obstruction:_____

Stoniness: ☐ very little (<1%)/ ☐ moderate (2-25%)/ ☐ very (>25%)

pH:_____ measured in ☐ soil or ☐ interstitial water

vonPost decomposition (peat substrates only) _____ at _____ deep

AVERAGE TEXTURE:

- ☐ gravel
- ☐ sand
- ☐ loamy sand / sandy loam
- ☐ loam
- ☐ silt loam
- ☐ clay loams
- ☐ sandy clay / clay
- ☐ peat
- ☐ muck

DRAINAGE & MOISTURE REGIME (see MAPPSS key):

- ☐ very poorly drained
- ☐ poorly drained
- ☐ somewhat poorly drained
- ☐ moderately well drained
- ☐ well drained
- ☐ somewhat excessively drained
- ☐ excessively drained

ELEVATION: 250 ft

☐ m or ☒ ft?

ASPECT (TRUE):

SLOPE : Include units! (45º = 100%)

0%-2%, estimated

☐ measured ☒ estimated

HYDROLOGIC REGIME:

- ☒ upland
- ☒ nontidal wetland:
  - ☐ perm flooded
  - ☐ semiper flooded
  - ☒ seasonally fld.
  - ☐ saturated
- ☐ tidal – irreg. fld.
- ☐ tidal – reg. fld.
  - ☐ saltwater
  - ☐ brackish
  - ☐ freshwater
- ☐ unknown

HABITAT PATCHINESS (describe zones or patches if present): Fairly uniform

MICROTOPOGRAPHY: generally level, with low ridges parallel to stream; rises gently to field.

BEDROCK TYPE:

- ☐ Igneous
  - ☐ granite
  - ☐ dioritic
  - ☐ gabbroic
- ☐ Metamorphic
  - ☐ slate/phyllite
  - ☐ schist/gneiss
- ☐ Sedimentary
  - ☐ limestone
  - ☐ other

details? Limy marine shale

TOPOGRAPHIC POSITION

- ☐ D drainage channel
- ☒ P low plain, level
- ☐ N narrow valley
- ☐ T toe of slope
- ☐ L lower slope
- ☐ M middle slope
- ☐ T hillside terrace
- ☐ U upper slope
- ☐ E cliff/ledge
- ☐ S ridge, summit, crest

SURFICIAL DEPOSIT:

- ☐ bedrock
- ☐ talus slope
- ☐ glacial till
- ☐ moraine
- ☐ esker/outwash
- ☐ glacial delta
- ☒ lacustrine/fluvial
- ☐ marine
- ☐ aeolian
- ☐ other:

THREATS TO COMMUNITY?

MANAGEMENT / PROTECTION NEEDS?

OTHER COMMENTS: animal use, species distribution notes, etc.

This c

IV. SUMMARY AND RANKING

Community name & EO#: Hardwood river terrace forest /Upper floodplain hardwood forest

Applicable National Type:	NVC CODE: CEGL00_____	Comment re fit to type?

COMMUNITY RANKING

1. CURRENT CONDITION and quality of the community itself.

- Comment on the species composition and biological structure of the community (species diversity, indicator species, development/maturity, etc.) For forests: Do you consider this to be old growth? If so, based on what?

  Not particularly enriched (no sugar maple, little basswood); nor particularly diverse (due to shading) but spring ephemeral community not assessed; forest is young; not old growth.

- Natural and anthropogenic disturbance **within** the community (check off, then describe extent and how recent below)

☐ Logging – most recently c. _____ yrs ago
☐ Agriculture / pasture
☐ Fire
☐ Wind or ice damage
☐ Impoundment
☐ Exotic plants
☐ Animal effects (insect outbreaks, browsing)
☐ Erosion
☐ Dumping or Mining
☐ ORV / vehicle disturbance
☐ Trails / roads
☐ Other, list: Adjacent powerline corridor; adjacent farm field

List disturbance(s): to what degree have these altered natural ecological processes, and/or do they appear to effect the population?

Quite invaded by honeysuckle; this may affect soil pH. quality and structure, and may limit regeneration of hardwood trees.

☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor).
☐ **B** – Some signs of human disturbance or degradation, but community generally intact.
☐ **C** – Signs of human disturbance or degradation, community compromised in some significant way.
☐ **D** – Highly disturbed (multiple impacts causing community to be drastically altered).

2. SIZE / QUALITY:

What is the approximate size of the community occurrence?_____7 acres___ ☐ acres / ☐ hectares

(Exclusive of lands E, and exclusive of an island W). Only observed in the project study area.

☐ Covers the natural extent of this community type ☐ Has been truncated through adjacent land use

Size / Quality Rank: ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor

3. LANDSCAPE CONTEXT of the area surrounding the community:

What land uses and/or natural communities surround the observed area? Describe the types and extent of anthropogenic disturbance **around** the observed area, and to what degree this may affect the observed community. To what degree can the observed community be protected from effects of adjacent land uses?
Powerline; farmland; not fully assessed due to limited study area. There appear to be larger communities both upstream and down.

☐ **A** – Community surrounded by >= 1000 acres of undisturbed landscape.
☐ **B** – Community surrounded by fairly intact landscape, though there may be cuts nearby.
☐ **C** – Community surrounded by fragmented forest or rural landscape.
☐ **D** – Surrounding area developed.

OVERALL RANK for Community ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant
based on your experience
Comments: Does not fully comport with published description (too much green ash, lack of diversity), young age, invaded by honeysuckle

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant
Date: Reviewer: Rationale:

PART II (con't): VEGETATION DATA from PLOT SAMPLING (replacing spp lists on p. 2, in cases where plots are taken)

Community type:			EOnum:
LAYER	plot #		
TREE list species and dbh for all trees >= 10 cm dbh; *count standing dead as 1 species.* **note units:** QUAD SIZE: **note which size used** 5.64 m radius for 1/100th ha 7.98 m radius for 2/100th ha use same size throughout!			
DEADWOOD (use tree plot) LARGE: (> 10cm dia); measure length in plot & middle dia): LIST DOM. SPP (IF KNOWN) SMALL (< 10 cm diameter): **1**: < 5% **2**: 6-24% **3**: 25%+			
SAPLING cover class by species of: trees/shrubs > 3 m tall but < 10 cm dbh; PLOT SIZE: 2.8 m radius			
SHRUB cover class by species of woodies > 1 m tall but < 3 m tall; PLOT SIZE: 2.8 m radius			
HERB cover class* by species for all herbaceous plants plus any woodies < 1 m tall QUAD SIZE: 1 m^2 , 4 herb quads per tree plot. Enter individual cover values in right-hand columns Remember the zeros for spp present in some but not all herb quads.	*Species*	*Species*	*Species*
BRYOID ground-layer mosses, liverwort, lichens in herb quads. **resolution** (check one): __"moss"/"liverwort"/"lichen" only; __identified to major group ("peat mosses, broom mosses, feather mosses", etc.); __identified to genus; __identified to species.			
REMARKS:			

In box on p.3, list plant spp. present in the community but not in the sample plots so we have a complete species list.

* cover classes (record midpoint): < 2 **1** 2-5% **3** 6-12% **9** 13-24% **19** 25-49% **37** 50-74% **63** 75-100% **87**

Please send completed form to: Information Manager, Maine Natural Areas Program, State House Station #93, Augusta, ME 04330

NATURAL COMMUNITY SURVEY

Project _____

I. IDENTIFIERS / LOCATION

Site Name: Robinson's Way Hardwood Community	**Obs. Pt. #:**	**Quadcode:**
Field-assigned Community Type: Enriched Hardwood Forest Identification or classification difficulties? Describe: Forest matches natural community description. It IS partially within a delineated wetland, which required review of both forested wetland and upland community types		USGS 7.5' Quad Name: The Forks Town: Moxie Gore
MNAP REVIEWED/EdITED TYPE:	Occurrence #:	County: Somerset
LANDOWNER INFORMATION: for each landowner Map / Lot / Name (& address if new landowner)		Date: 7/26/18 Surveyors: M. Lin SourceCode: F_____ Biophysical Region:

GPS Coordinates (☒ NAD 83, UTM Zone 19N; ☐ Other-please specify) Lat. 45.35697517, Long. -69.89488551

Directions to occurrence: Enriched Hardwood community is located between Robinson's Way and Moxie Lake Road. The community is just east of Robinson's Way and approximately 0.2 mile north of Moxie Lake Road. The community extended south, beyond the Project Area delineated for the survey effort

☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

FEATURE MAP. Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation. Locational uncertainty refers to any uncertainty there is as to where the actual observation occurred. Confidence extent indicates how confident you are that the observed area represents the full extent of the feature.

Locational Uncertainty:

☐ Areal delimited

☒ Mapped to within 12.5 m of actual location

☐ Greater uncertainty (please indicate)

_____50_____ m / ft / km / miles

Confidence Extent:

☐ **Y** - Confident full extent of feature **IS** known

☐ **N** - Confident full extent is **NOT** known

☒ **?** - **Uncertain** whether full extent is known

GENERAL DESCRIPTION OF COMMUNITY(See instructions for guidelines):

The forest is dominated by Black Ash, American Elm, and Ironwood. Sugar Maple and Yellow Birch were also common. Maiden hair fern and silver spleenwort are common. Wetter areas contained jewel weed and dwarf enchanters nightshade as well as other herbaceous species. Basswood was observed, though infrequent.

The community is on a generally north-facing slope with a low gradient of 0-10% slope. Loamy soils ranged from silty sandy loam to silty loam. The soils were rich and contained well developed structure in the more upland areas.

The community extended beyond the boundaries of our survey area, to the south and was therefore not mapped beyond that point

SAMPLE TYPE:	Additional sampling recommended?
__X__ Brief descriptive – **NOT SUFFICIENT FOR DOCUMENTING NEW EOs**	☐ Yes ☐ No
____ Generalized cover estimates & dbhs (p2)	Photos: ☐ Yes ☐ No
____ Nested plot samples (N = _____) (attach)	

II. VEGETATION BY STRATA

Community name & EO#:

TREE LAYER (canopy plus emergents, everything ≥ 10 cm dbh)

TOTAL COVER OF STRATUM:
<5% 10% 20% 30% 40% **50%** 60% 70% 80% 90+%

Total Basal Area: ft²/acre NC

Conifer %:0

Canopy height ____40___m or ft
Supercanopy spp? No

Species name/code	Cover class*	Dbh range ☐in ☒cm	Core ages	Species name/code	Cover class*	Dbh range ☐in ☐cm	Core ages	☐ check here if plot data are attached instead
Acer saccharum	19	10-60	NA					
Fraxinus nigra	19	10-50	NA					
Ulmus americana	9	10-25	NA					
Carpinus caroliniana	9	10-20						

SAPLING / TALL SHRUB LAYER (> 3 m tall and < 10 cm dbh)

TOTAL COVER OF STRATUM: <5% 10% 20% **30%** 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Ulmus americana	9			
Acer saccharum	19			
Carpinus caroliniana	19			
Tilia americana	1			

SHRUB LAYER (woody plants ~1 - 3 m tall)

TOTAL COVER OF STRATUM: <5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Acer saccharum	9			
Viburnum lantanoides	3			
Fraxinus nigra	9			

HERB / DWARF SHRUB LAYER (all herbaceous vascular plants plus any woody plants < 1 m tall)

TOTAL COVER OF STRATUM:
<5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE : tree regen_____%; shrub_____%;
graminoid____0____%; forb___75____%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Adiantum pedatum	19			
Deparia acrostichoides	19			
Matteuccia struthiopteris	9			
Aralia nudicaulis	9			
Polystichum acrostichoides	3			

BRYOID LAYER (all ground-layer non-vascular plants; do not include epiphytes)

TOTAL COVER OF STRATUM:
<5% 10% 20% 30% 40% 50% 60% 70% 80% 90+%

DOMINANCE: bryophytes_____<5%____% lichens ____0____%

Species name/code	Cover class*	Species name/code	Cover class*	check here if plot data are attached instead ☐
Minimal and not keyed out	1			

*cover classes (**midpoint**): < 2%= **1**, 2-5%= **3**, 6-12%= **9**, 13-24%= **19**, 25-49%= **37**, 50-74%= **63**, 75-100%= **87**

ADDITIONAL SPECIES within area where vegetation cover by strata were taken

Stratum	Species code	Cover class	Stratum	Species code	Cover class

OTHER PLANT SPP seen in community (spp codes), for complete plant species list

Enchanters nightshade, maple, white ash, yellow birch, small component of balsam fir, knapweed, jewelweed and sedges (in wetter areas), jack in the pulpit, woodfern

III. ENVIRONMENTAL SETTING

Community name & EO#:

SOILS (rooting zone): Only brief inspection of soils conducted

Sample #____

Depth to which soil examined__2 in__

Organic layer depth_____cm or ☐ >1 m

Mineral layer below organic? _____depth_____

Mottling in top 30 cm?_____depth_____

Depth to water table:_____

Depth to obstruction:_____ nature of obstruction:_____

Stoniness: ☒ very little (<1%)/ ☐ moderate (2-25%)/ ☐ very (>25%)

pH:_____ measured in ☐ soil or ☐ interstitial water

vonPost decomposition (peat substrates only) _____ at _____ deep

AVERAGE TEXTURE:

- ☐ gravel
- ☐ sand
- ☒ loamy sand / sandy loam
- ☐ loam
- ☒ silt loam
- ☐ clay loams
- ☐ sandy clay / clay
- ☐ peat
- ☐ muck

DRAINAGE & MOISTURE REGIME (see MAPPSS key):

- ☐ very poorly drained
- ☐ poorly drained
- ☒ somewhat poorly drained
- ☒ moderately well drained
- ☐ well drained
- ☐ somewhat excessively drained
- ☐ excessively drained

ELEVATION: 1000

☐ m or ☒ ft?

ASPECT (TRUE):

North

SLOPE : Include units! (45º = 100%)

0%-5

☐ measured ☒ estimated

HYDROLOGIC REGIME:

- ☒ upland
- ☒ nontidal wetland:
  - ☐ perm flooded
  - ☐ semiper flooded
  - ☒ seasonally fld.
  - ☐ saturated
- ☐ tidal – irreg. fld.
- ☐ tidal – reg. fld.
  - ☐ saltwater
  - ☐ brackish
  - ☐ freshwater
- ☐ unknown

HABITAT PATCHINESS (describe zones or patches if present): Patches of wetter areas with jewelweed and enchanters nightshade; damp silty loam and evidence of surface flow channels throughout. Higher elevation areas had a more developed mineral soil with a sandy loam texture

MICROTOPOGRAPHY: some low hill with channel topography, where wetland and upland soils meet.

BEDROCK TYPE:

- ☐ Igneous
  - ☐ granite
  - ☐ dioritic
  - ☐ gabbroic
- ☐ Metamorphic
  - ☐ slate/phyllite
  - ☐ schist/gneiss
- ☐ Sedimentary
  - ☐ limestone
  - ☐ other

details?

TOPOGRAPHIC POSITION

- ☐ D drainage channel
- ☐ P low plain, level
- ☐ N narrow valley
- ☐ T toe of slope
- ☐ L lower slope
- ☒ M middle slope
- ☐ T hillside terrace
- ☐ U upper slope
- ☐ E cliff/ledge
- ☐ S ridge, summit, crest

SURFICIAL DEPOSIT:

- ☐ bedrock
- ☐ talus slope
- ☐ glacial till
- ☐ moraine
- ☐ esker/outwash
- ☐ glacial delta
- ☒ lacustrine/fluvial
- ☐ marine
- ☐ aeolian
- ☐ other:

THREATS TO COMMUNITY?

Logging potential, evidence of past logging

MANAGEMENT / PROTECTION NEEDS?

OTHER COMMENTS: The forest is relateively well delineated based on the distribution of the Northern maindenhair fern and silvery spleenwort. There is a mix of upland and wetland areas but an overall dominance of the enriched hardwood characteristics.

.

IV. SUMMARY AND RANKING

Community name & EO#: Hardwood river terrace forest /Upper floodplain hardwood forest

Applicable National Type:	NVC CODE: CEGL00_____	Comment re fit to type?

COMMUNITY RANKING

1. CURRENT CONDITION and quality of the community itself.

- Comment on the species composition and biological structure of the community (species diversity, indicator species, development/maturity, etc.) For forests: Do you consider this to be old growth? If so, based on what?

  Second- or third-growth forest, some larger trees, but dominated by mid-sized trees and saplings. Forest structure is developing nicely, though. Indicator species for this habitat type were common, animal use was evident, and invasive species were minimum

- Natural and anthropogenic disturbance **within** the community (check off, then describe extent and how recent below)

☒ Logging – most recently c. __>50__ yrs ago	☒ Animal effects (insect outbreaks, browsing)
☐ Agriculture / pasture	☐ Erosion
☐ Fire	☐ Dumping or Mining
☒ Wind or ice damage	☐ ORV / vehicle disturbance
☐ Impoundment	☐ Trails / roads
☐ Exotic plants	☐ Other, list:

List disturbance(s): to what degree have these altered natural ecological processes, and/or do they appear to effect the population?

Past logging likely had a large impact on the population, however it appears to be recovering nicely, browsing and insect damage appear to be within healthy ranges. Wind damage was evident though minor and much less than in adjacent habitats

Logging has occurred in the past, as evidenced by decaying stumps. Habitat is near roads

☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor).
☒ **B** – Some signs of human disturbance or degradation, but community generally intact.
☐ **C** – Signs of human disturbance or degradation, community compromised in some significant way.
☐ **D** – Highly disturbed (multiple impacts causing community to be drastically altered).

2. SIZE / QUALITY:

What is the approximate size of the community occurrence?_____3-5 _____ ☒ acres / ☐ hectares

☒ Covers the natural extent of this community type ☐ Has been truncated through adjacent land use

Size / Quality Rank: ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ **D** – Poor

3. LANDSCAPE CONTEXT of the area surrounding the community:

What land uses and/or natural communities surround the observed area? Describe the types and extent of anthropogenic disturbance **around** the observed area, and to what degree this may affect the observed community. To what degree can the observed community be protected from effects of adjacent land uses?

Area is near roads, powerline corridor and houses, however there is fairly contiguous forest, in different stages of development, nearby

☐ **A** – Community surrounded by >= 1000 acres of undisturbed landscape.
☒ **B** – Community surrounded by fairly intact landscape, though there may be cuts nearby.
☐ C – Community surrounded by fragmented forest or rural landscape.
☐ **D** – Surrounding area developed.

OVERALL RANK for Community ☐ **A** – Excellent ☒ **B** – Good ☐ **C** – Fair ☐ D – Poor ☐ **E** – Extant
based on your experience
Comments: Nice community with typical indicator species present; appears to be relatively small, although entire extent is not known c
limits of survey area. Within
hardwood matrix forest.

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

PART II (con't): VEGETATION DATA from PLOT SAMPLING (replacing spp lists on p. 2, in cases where plots are taken)

Community type:			EOnum:
LAYER	plot #		
TREE list species and dbh for all trees >= 10 cm dbh; *count standing dead as 1 species.* **note units:** QUAD SIZE: **note which size used** 5.64 m radius for 1/100th ha 7.98 m radius for 2/100th ha use same size throughout!			
DEADWOOD (use tree plot) LARGE: (> 10cm dia); measure length in plot & middle dia): LIST DOM. SPP (IF KNOWN) SMALL (< 10 cm diameter): **1**: < 5% **2**: 6-24% **3**: 25%+			
SAPLING cover class by species of: trees/shrubs > 3 m tall but < 10 cm dbh; PLOT SIZE: 2.8 m radius			
SHRUB cover class by species of woodies > 1 m tall but < 3 m tall; PLOT SIZE: 2.8 m radius			
HERB cover class* by species for all herbaceous plants plus any woodies < 1 m tall QUAD SIZE: 1 m^2 , 4 herb quads per tree plot. Enter individual cover values in right-hand columns Remember the zeros for spp present in some but not all herb quads.	*Species*	*Species*	*Species*
BRYOID ground-layer mosses, liverwort, lichens in herb quads. **resolution** (check one): __"moss"/"liverwort"/"lichen" only; __identified to major group ("peat mosses, broom mosses, feather mosses", etc.); __identified to genus; __identified to species.			
REMARKS:			

In box on p.3, list plant spp. present in the community but not in the sample plots so we have a complete species list.

* cover classes (record midpoint): < 2 **1** 2-5% **3** 6-12% **9** 13-24% **19** 25-49% **37** 50-74% **63** 75-100% **87**

Please send completed form to: Information Manager, Maine Natural Areas Program, State House Station #93, Augusta, ME 04330

APPENDIX E

Landscape Analysis Description and Field Survey Protocol for Small-Whorled Pogonia

New England Clean Energy Connect (NECEC) Project
Rare Plant and Exemplary Natural Community
Landscape Analysis and Field Survey Protocol

Introduction

Numerous plant species in Maine are considered rare, threatened, and endangered ("RTE"), and these are protected under both the federal Endangered Species Act of 1973 (16 U.S.C. §§ 1531 et seq.) and Maine's Natural Areas Program (MNAP) statute (12 M.R.S. §§ 544, 544-B & 544- C). Under the federal Endangered Species Act there are one endangered and two threatened plant species in Maine. These plants include the Furbish's lousewort (*Pedicularis furbishiae*), prairie white-fringed orchid (*Plantanthera leucophaea*), and small-whorled pogonia (*Isotria medeoloides*). The Official Species List, obtained through the ECOS-IPAC website, identified the small-whorled pogonia (federally threatened) and its possible presence within the boundaries of the NECEC project.

MNAP has also classified natural and distinguished vegetative communities across the state and has identified rare and unusual natural community types. According to MNAP, "A natural community is an assemblage of interacting plants and animals and their common environment, recurring across the landscape, in which the effects of human intervention are minimal. A natural community includes all of the organisms (plant and animal) in a particular physical setting, as well as the physical setting itself" (Gawler and Cutko 2010).

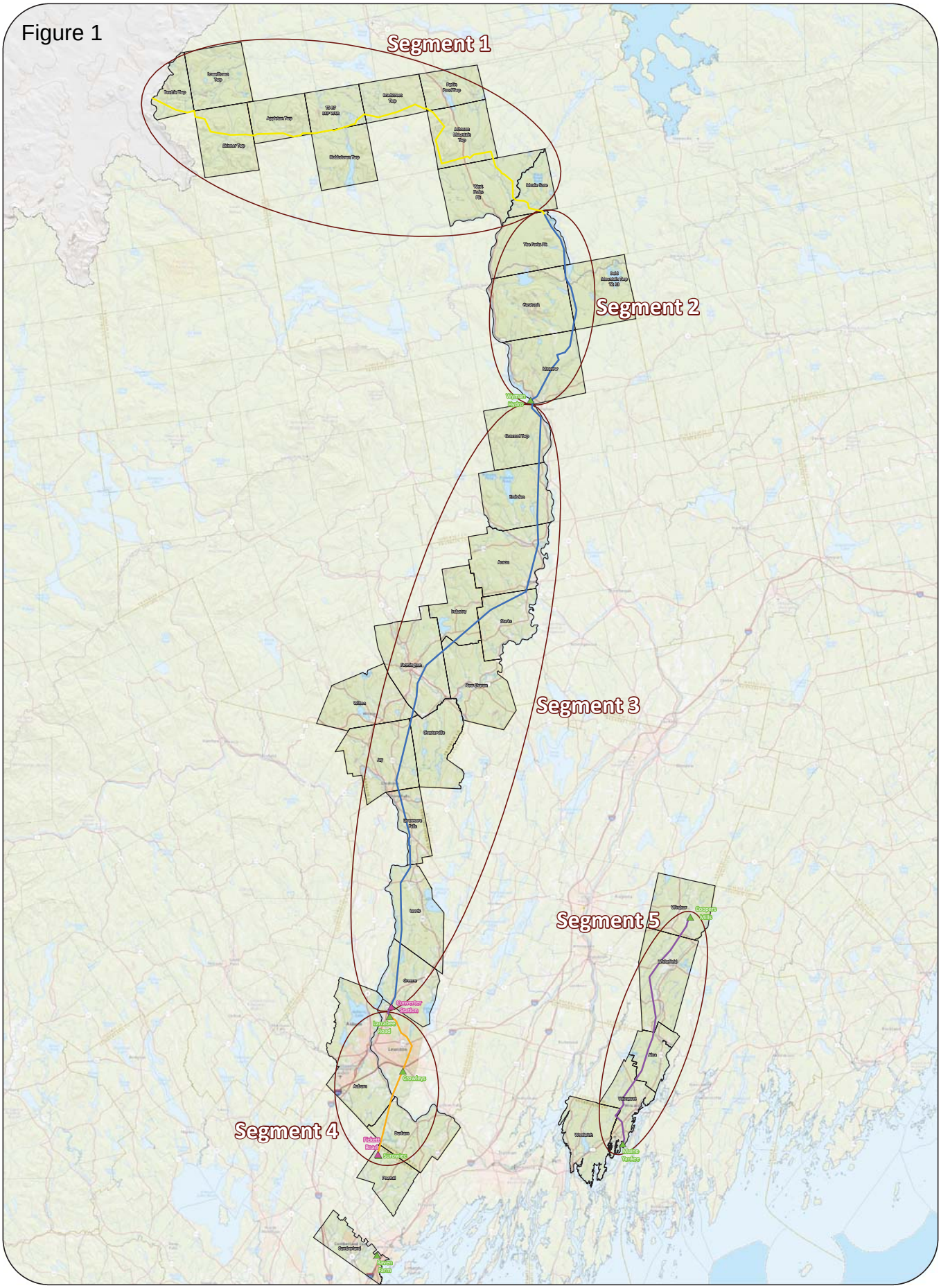
Central Maine Power Company (CMP), in developing its state and federal permit applications for the NECEC Project, submitted a letter to MNAP on May 10, 2017 requesting information on rare plants and exemplary natural communities in the Project area. MNAP provided the requested information and in its review of the Project strongly recommended landscape analysis and subsequent field surveys be conducted within previously un-surveyed portions of the Project Area, as well as resurvey of previously documented features in Segments 3, 4, and 5 (MNAP 2017).

Background

Segments 1 and 2 of the NECEC Project, located between the Canadian border in Beattie Township and Wyman Hydropower Station in Moscow (See Figure 1), are the portions of the project that have not previously been surveyed for rare plants and exemplary natural communities. Segments 3, 4, and 5 are within areas previously surveyed for rare plants during the permitting effort for CMP's Maine Power Reliability Program (MPRP). As part of MPRP, CMP consulted with MNAP to gather rare plant and natural community data and to develop a methodology to conduct rare plant surveys. As a result of those surveys, only a few locations in Segments 3, 4, and 5 were identified as having RTE plants and rare or exemplary natural communities.

On June 7, 2017, an interagency meeting was held with MNAP, United States Fish and Wildlife Service (USFWS), and the United States Department of Energy (USDOE) at the CMP office in Augusta to discuss landscape analysis and survey methods for rare plants and exemplary natural communities that would be implemented for the NECEC Project. At that meeting MNAP indicated that the northern portion of the Project, primarily Segments 1 and 2, is not an area with a high occurrence of documented rare plant species and stated that a desktop landscape analysis and field survey was necessary in those areas.

Figure 1



Legend

- HVDC (New ROW)
- HVDC (Existing ROW)
- New 345 kV Line
- Rebuild Sections
- Existing Substation
- Proposed Substation

New England Clean Energy Connect
Overview Map

10 Miles

CENTRAL MAINE POWER

8/15/2017

MNAP also determined that existing data on state-listed rare plants and exemplary natural communities within Segments 3, 4, and 5 was sufficient and recommended that CMP re-survey the known occurrences in those portions of the Project. MNAP and USFWS agreed that agency-provided habitat modeling should be used in conjunction with landscape analysis on Segment 3 between Jay and Lewiston for small whorled pogonia, due to annual variability of species presence in suitable habitats.

Methodology

Landscape Analysis

A landscape analysis will be performed on NECEC Segments 1, and 2, and Segment 3 (Jay to Lewiston portion only), using the following data sources:

1. USGS topographic maps
2. Color aerial photography
3. MNAP rare plant occurrence data
4. MNAP mapped rare or exemplary natural community locations
5. NECEC natural resource inventory data
6. Surface geology data
7. Soil survey data
8. Agency Natural Heritage habitat modeling for small whorled pogonia

Once all data is acquired it will be uploaded to ESRI's ArcGIS software to support the review and analysis of the project area for unique habitat features. Features that will be considered include:

1. Areas of high relief
    a. Steep slopes
        i. 16-30%
        ii. 31-45%
    b. Valleys and ravines
    c. Cliff faces and their bases
2. Areas within a defined distance of known occurrences containing similar habitat
    a. 1,000-foot distance from all known occurrences
    b. Selectively greater distances in areas adjacent to exemplary natural communities
3. Wetland systems
    a. Large wetland systems
    b. Major rivers and streams (and associated landforms)
4. Bedrock exposure
    a. Talus
    b. Serpentine bedrock
    c. Limestone bedrock
    d. Ledge outcrops
5. Unique soils
    a. Sandplains and areas with sandy soils
    b. "Rich soils", including peaty and loamy soils
6. Natural communities and landforms
    a. Mid-successional, mixed wood, mesic forest (small whorled pogonia)
    b. Maple basswood ash forests
    c. Red pine woodland
    d. Spruce pine woodland

e. Open cedar fen
f. Silver maple floodplain forest
g. Saddles
h. Cold-air talus slopes

Areas identified as containing potential habitat for RTE plants, or rare natural communities, will be delineated in ArcGIS and a shapefile (or similar format) of the proposed survey locations will be provided to MNAP and USFWS for review and comment. The implementation of field surveys on Segments 1 and 2 and the portion of Segment 3 to be surveyed for small whorled pogonia will be initiated after receiving agency review and approval of the proposed survey locations.

Resurvey of known occurrences on NECEC Segments 3, 4, and 5 will be begin as early as June or when conditions are determined to be favorable.

Field Survey

The purpose of the field effort will be to survey unique habitat features for the possible presence of RTE plant species and rare or exemplary natural communities. All locations identified as containing potentially unique habitat through landscape analysis, as well as any unique habitat features identified in the field, will be surveyed. Surveyors will search for any RTE plant species protected under federal and/or Maine law, as well as rare or exemplary natural communities, but will primarily focus on those known to occur in each region or vicinity. Surveyors will have sufficient experience in plant identification to be able to correctly identify RTE species. The qualifications of field survey personnel will be provided to MNAP and USFWS.

Field survey crews will be provided with a set of maps depicting the final survey locations identified through occurrence data, the landscape analysis, and agency input. The survey locations will also be loaded into global positioning system (GPS) software for use in the field.

Field surveys will be generally conducted, between June 1 and October 1. Surveys will begin in the northern portions of the project (Segments 1 and 2) in mid-June to allow for additional leaf-out time to assist with proper plant identification. Surveys will consist of "meandering searches", which involve walking a stretch of ROW (proposed or existing) twice: once along each side of the ROW, in a zig-zag pattern to ensure adequate coverage of the ROW. Generally, the distance of each meandering zig-zag will vary depending on terrain and vegetation and will visually cover approximately 30 to 50 meters. Habitat features known to support rare species and locations adjacent to unique natural communities will be thoroughly searched. If habitat conditions are observed to be favorable for the presence of RTE plants, the surveyor(s) will proceed at a reduced pace and narrow their search.

Large sections of proposed ROW that are not identified as having suitable habitat during the landscape analysis will be randomly sampled. As recommended by MNAP, random samples will include 10% of the ROW (equivalent to ¼ mile per 3 miles of ROW) in locations where no unique habitat features were identified during the landscape analysis. CMP will re-evaluate the random sampling protocol following agency review of the results of the landscape analysis and will adjust the frequency of sampling as needed.

Rare plant populations will be mapped to sub-meter accuracy, and locations will be noted and documented in a shapefile that will be provided to MNAP and USFWS (for small whorled pogonia, if found) upon completion of the field survey. In the event a large population of rare species is identified it will be mapped by creating a polygon around the entire population, with the understanding that the

density of the population may vary throughout. Small or single-stem populations will be mapped as point data with a radius of 3 meters.

Small whorled pogonia surveys will be conducted using the protocols identified in the MNAP fact sheet: *Small Whorled Pogonia Survey Protocols for Maine* (See Attachment A). Any small whorled pogonia identified during the field survey will be recorded on MNAP survey forms and the documentation will be provided to both MNAP and the USFWS.

Documentation of all rare plants and exemplary natural communities will be performed on survey forms provided by MNAP, and per their associated instructions (See Attachment B). These forms include basic information for the identified feature, including population size, geographic area, the species or community's current condition (e.g., flowering, vegetative), and evidence of disturbance. Additional information includes, but is not limited to, the name of the observer, date of survey, and general location (e.g., segment, town). All forms will be submitted to MNAP upon completion of the field survey.

A final report documenting the results of the field survey effort will be provided for agency review following the conclusion of the survey.

REFERENCES

Gawler, S. and A. Cutko. 2010. Natural landscapes of Maine: A Guide to Natural Communities and Ecosystems. Maine Natural Areas Program, Maine Department of Conservation. Augusta, Maine. 347 pp.

MNAP 2017. Memorandum to Maine Department of Environmental Protection – Rare and Exemplary Botanical Features, NECEC Transmission Line and Substation.

Attachment A
Small Whorled Pogonia Survey Protocols for Maine

Small Whorled Pogonia (*Isotria medeoloides*) Survey Protocols for Maine

Introduction: Small whorled pogonia is a rare native orchid of eastern N.A. that is listed as Threatened under the federal Endangered Species Act, and as Endangered by the state of Maine. For additional guidance on conducting surveys, on the biology of the species, or for field assistance for completing a survey contact the Maine Natural Areas Program (Don Cameron, Don.S.Cameron@maine.gov; 207 287-8041).

Species Description: Small whorled pogonia plants appear in the late spring (late May to early June) from a perennial underground rootstock. Stems usually grow singly, though sometimes in pairs, and are 3-6" (8-15 cm) tall. Under normal conditions plants produce a single whorl of 5 elliptical leaves 1-3" (2.5-8 cm) long at the top of the stem. Occasionally, a single small leaf will also grow under the whorl along the stem. Note that the plants are often the target of small herbivores and may lose one or more of their leaves. The stem itself is moderately stout, about 1/8' (2-3 mm) wide, and glaucous pale green. Half or more of the plants in any given population will grow vegetatively in any given year, bearing no flowers or fruit. On reproductive plants, 1 to 2 flowers appear soon after emergence. They are greenish yellow, about 1' (2.5 cm) long, and born on top of the whorl of leaves. Pollinated flowers will produce an upright, cylindrical fruit (a capsule) about 1" (2.5 cm) long by ¼" wide (0.6 cm), which turns from pale green to light brown by the fall when it splits open to release thousands of dust-like seeds. Review the species pictures included on the last page, and search on line for additional images capturing the variety of plant conditions.

Look-a-Likes: Other common whorled-leaved herbs that grow in small whorled pogonia habitat in Maine include starflower (*Lysimachia borealis*, a.k.a. *Trientalis borealis*), bunchberry (*Chamaepericlymenum canadense*, a.k.a. *Cornus canadensis*), and Indian cucumber-root (*Medeola virginiana*). Of these three species, vegetative Indian cucumber-root plants are most similar to small whorled pogonia, but can be readily distinguished from it by their narrow, darkened, pubescent stems. Anyone unfamiliar with small whorled pogonia should brush up on the identification of these three look-a-likes as needed.

Population and Habitat Characteristics: Plants within a population are usually thinly scattered and widely spaced though occasionally several will occur in local group. In Maine, small whorled pogonia typically occurs in mid-successional, mixed wood, mesic forests with a sparse shrub layer and thick leaf litter. Herb cover may vary ranging from high cover of ferns and other herbs to very little cover. The plants often occur near intermittent streamlets or where a hardpan impedes water percolation into the soil. Some common associated understory plants include Indian cucumber-root (*Medeola virginiana*), New York fern (*Thelypteris novaboracensis*), cinnamon fern (*Osmunda cinnamomea*), partridgeberry (*Mitchella repens*), and rattlesnake plantain (*Goodyera pubescens*).

Survey Guidance: Due to the inconspicuous nature of the plants, relatively small sizes of populations, and the thin distribution of plants within supporting habitat, small whorled pogonia populations can be difficult to detect. A survey of a given area should be methodical, and completed with concentration and focus. Ideally surveys for this species should be conducted by botanically trained individuals who have previously seen the species and its preferred habitat.

Time of Year: Surveys should be conducted between June 8 and September 31, the period of the growing season when plants are emerged and have leaves. Plants may sometimes be found with leaves and capsules as late as early October, at which time leaves will turning yellow and will otherwise show signs of wear. Plants may be sometimes found outside of this calendar window but negative surveys outside of the calendar window cannot be considered conclusive.

Recommended Survey Methods: Start by assessing the habitat types at the site. Identify areas with conditions that may support the species. The species only grows under a forest canopy. The canopy may be closed or have gaps. The species does not grow in habitats that lack a forest canopy (open fields, shrub dominated areas, early successional cover) nor does it grow in wetlands, though it does sometimes grow in low-lying areas near the edges of wetlands or along small streams. Once potential habitat areas are identified they should be surveyed methodically by dividing them up into visual units. Visual units can be delimited by local topography (ravines, slopes, benches), or by landmarks (boulders, downed or otherwise conspicuous trees, old woods roads, stone walls), and or by hanging survey ribbon or placing wire flags. The surveyor should slowly walk back and forth progressing through a given visual unit. A stick or pole is helpful for nudging ferns clumps or low hemlock branches aside. Squatting and peering under tall ferns is also a good way to spot plants. As small whorled pogonia plants are relatively small and blend in well, it is very important to keep attention focused in the area immediately around yourself (0-10' radius). In areas with very thin ground cover such as what occurs under mature hemlocks, it is possible to spot plants as much as 25' feet away, but most plants are found within 10' of an observer. Maintaining a track with a GPS unit is very useful for documenting survey effort and identifying survey gaps.

Small whorled pogonia plants may grow anywhere within a site where a population is located but it favors certain micro-habitats such as:

- vernal or ephemeral runoff courses (leaf piles)
- terraces or benches and base-of-slope areas.
- small canopy openings, fern patches

Documenting a Population: If one or more small whorled pogonia plants are found, tie brightly colored surveyor ribbon adjacent to each plant and collect GPS coordinates at the respective locations. Take close up digital images of the plants to be used for subsequent confirmation of the species by the Maine Natural Areas Program. Once plants have been found, spend additional time searching the areas within a 20' radius of each plant, as there is a comparatively high probability of finding additional plants within this area.

If plants are found, minimize impacts by limiting foot traffic and any other potential disturbances in and around areas where they are growing. Avoid touching plants with fingers as handling can attract herbivores.

Upon completion of the survey, make sure there is an easy and obvious way to relocate any plants that were found.

If plants are found, please contact the Maine Natural Areas Program for recommendations regarding any proposed land uses (287-8044/maine.nap@maine.gov).

Small whorled pogonia (*Isotria medeoloides*):

Ideal flowering specimen (early June)

Late season, vegetative plants

Hidden in ferns, a not uncommon location

Plants with capsules

Attachment B
MNAP Rare Plant Survey Form and Instructions

Project (MNAP assigns) _____

SPECIAL PLANT SURVEY FORM

Site: _____ Survey Site: _____

Quad name: _____ Quad code: _____

County: _____ Town: _____

Plant Name: ☐ New ☐ Update Occurrence #:

Date:	Surveyor(s):	Sourcecode (MNAP assigns):
Primary Surveyor Address:	Phone:	Email:

GPS Datum ☐WGS 84 ☒NAD 83 ☐ NAD 27 ☐ Other
GPS Coordinates ☐ UTM Zone 19N ☐ Decimal Degrees (dd.dddd) ☐ Deg Min Sec (dd mm ss) ☐ GPS (dd mm.mm) ☐ Other
North West Additional Coordinates

Directions to Occurrence:
☐ Strongly recommend use of air photos and USGS topographic maps for relocation of the site on the ground.

MAP: Please attach a map, preferably 1:24,000 scale topo map, showing the location of the observation.

Locational Uncertainty (how closely can you map the feature to its actual location?)

☐ mapped to w/in 12.5 m of actual location; ☐ greater uncertainty (estimate = ☐m / ☐ft / ☐km / ☐miles); ☐ aerial delimited

Confidence in Observation of Population Extent

☐ Confident full extent of feature **IS** known; ☐ Confident full extent is **NOT** known; ☐ **Uncertain** whether full extent is known

EO DATA	Phenology	Population Area	Vigor? ☐ Normal ☐ Other than normal Explain:
# of Plants ☐ Individuals ☐ Ramets Population Structure % Vegetative % Reproductive	☐ In leaf ☐ In bud ☐ In flower ☐ Immature fruit ☐ Mature fruit ☐ Seed dispersing ☐ Dormant	☐ 1 square yard ☐ 1 – 5 square yards ☐ 5 – 20 square yards ☐ 20 – 100 square yards ☐ 100 sq yds to 1 acre ☐ 1 acre + ~area **actual** habitat ~ area **potential** habitat	Evidence disease, predation, etc? Explain: ☐ Yes ☐ No Type of reproduction? Explain: ☐ Sexual ☐ Asexual ☐ Not Observed
Other Comments:			

GENERAL DESCRIPTION

Associated natural community:
Associated plant species:
Substrate/soil type:
Threats to Population:
Conservation/Management/Research needs:

Elevation	**Aspect**	**% Slope**	**Light**	**Topographic Position**	**Moisture**
Min ft / m Max ft / m	☐ N ☐ NE ☐ E ☐ NW ☐ S ☐ SE ☐ W ☐ SW ☐ Flat or NA	☐ Flat ☐ 0-10 ☐ 10-35 ☐ 35+ ☐ Vertical	☐ Open ☐ Partial ☐ Filtered ☐ Shade	☐ Crest ☐ Upper Slope ☐ Mid-slope ☐ Lower Slope ☐ Bottom ☐ Level Plain	☐ Inundated ☐ Saturated (wet mesic) ☐ Moist (mesic) ☐ Dry-mesic ☐ Dry (xeric)

Project (MNAP assigns) _____

Photograph taken?	Specimen collected?	Do other members of this genus occur at this site?
☐ No ☐ Yes	☐ No ☐ Yes Collection # Repository	☐ No ☐ Yes If yes, are there hybridization issues? ☐ No; ☐ Yes; Explain Are there identification issues? ☐ No; ☐ Yes; Explain

Landowner name/address for entire population (attach additional owner information on a separate sheet):	Phone	Is landowner aware of plant? ☐ Yes ☐ No
	Tax map # (if known)	Is landowner protecting plant? ☐ Yes ☐ No
	Lot # (if known)	Comments

EO RANKING

CURRENT CONDITION of the plant's immediate habitat. Is the habitat pristine or degraded? Note any disturbances within the plant habitat (check off, describe below to what degree these have altered natural ecological processes, or if they have any negative or positive effects on the population). Note how the disturbance(s) may influence success of the plant at the site.

☐ Logging-most recently ~ yrs ago
☐ Agriculture / Pasture
☐ Animal effects (insect outbreaks, browsing)
☐ Wind or ice damage
☐ Fire
☐ Impoundment
☐ Exotic plants
☐ Erosion
☐ Dumping or mining
☐ ORV / Vehicle disturbance
☐ Trails / Roads
☐ Other
☐ No Evidence of disturbance

Describe:

Condition Rank
☐ **A** – No apparent signs of human disturbance (or long enough ago that effects are no longer visible or are extremely minor)
☐ **B** – Some signs of human disturbance or degradation, but habitat generally intact
☐ **C** – Signs of human disturbance or degradation, and habitat compromised in some significant way
☐ **D** – Highly disturbed (multiple impacts causing habitat to be drastically altered)
☐ **Other** / Habitat disturbed, consistent with needs of species / **Explain**:

SIZE / QUALITY: How large is this population relative to typical populations of this species?
Does it appear to be capable of maintaining itself if its habitat remains basically intact? ☐ Yes ☐ No

Size / Quality Rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor

Comments:

LANDSCAPE CONTEXT of the area surrounding the plant habitat. What land uses and/or natural communities surround the observed area? Is the habitat fragmented? To what degree can the population be protected from effects of adjacent land uses?

Comments:

Landscape Rank
☐ **A** – Population surrounded by > = 1000 acres of undisturbed landscape
☐ **B** – Population surrounded by fairly intact landscape, though there may be cuts nearby
☐ **C** – Population surrounded by fragmented forest or rural landscape
☐ **D** – Surrounding area developed
☐ **Other** / Explain:

OVERALL RANK for EO based on your experience ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Comments:

MNAP reviewed / verified rank ☐ **A** – Excellent ☐ **B** – Good ☐ **C** – Fair ☐ **D** – Poor ☐ **E** – Extant

Date: Reviewer: Rationale:

Special Plant Survey Form Instructions

Areas shaded gray are to be filled in by Maine Natural Areas Program (Sourcecode and MNAP reviewed/verified rank).

At a minimum, we need the following: A map showing where you were/where the plant was observed, your name, the date of the survey, the plant name, and the number of plants/relative size of the population. However, additional data fields on the form are extremely helpful, so please try to fill them in.

Site and Survey site: Some areas within the state have been visited repeatedly, and these typically have a site name. Some larger areas also have smaller survey site names. For instance, 'Mt. Katahdin' is a site name, but 'Chimney Pond' is a survey site name. If you don't know the name of the site, leave it blank. You can assign a survey site name, but do this based on some feature/place name, preferably one visible on a USGS topographical map.

Quad name and Quad code: The name of the USGS quad (1:24,000 scale) where the plant is located. If you don't know the quad code, leave it blank.

County and Town: The name of the county and town where the plant is located.

Date: Date of survey/observation.

Surveyor(s): Please list principal surveyor first.

Sourcecode: Please leave this section blank.

Plant name: Scientific name is preferred.

GPS Coordinates: If you have a GPS unit, please use it! Record the location of the plant. Remember, NAD 83 is most helpful, and we are in UTM Zone 19N. If you use another datum, please indicate what it is (e.g., NAD 27). Also, please record the accuracy of your unit.

Directions to Occurrence: Directions to the site can be in general terms, but please be specific about directions to the plant location. We would like enough detail that a person could use these directions to relocate the plant.

Feature Map: A 1:24,000 scale USGS map is most helpful, though you can zoom in to the area to show the location of the plant. However, if you do zoom in, be sure that enough locational information is on the map that a person can relate your map to the larger quad. Indicate on the map the exact location of the observation(s).

- If your observation is a small patch or a small number of individuals, place a SMALL DOT on the map, with an arrow pointing to it or a large circle around it so it can be easily seen.

- If you are mapping a larger plant population,

    a) Draw a thin solid boundary line showing the extent of the observed area occupied by the population.

    b) Indicate disjunct patches (polygons) by drawing the boundary for each patch separately.

    c) If the boundary follows the edge of a lake, stream, road, marsh, or other feature, draw the boundary precisely on the edge of the feature.

    d) Where needed, add notes to the map with instructions on where the boundary line is located or if the boundary is shared with other observations.

Locational Uncertainty: This refers to any uncertainty you may have as to where the actual observation occurred. Are you certain that you are within 12.5 meters (~40 feet) of where the plant actually grows? If not, please estimate your uncertainty distance based on landmarks, elevation, etc. If you mapped a population based on air photos, you may choose areal delimited.

Confidence Extent: Are you confident that the full extent of occupied habitat or area of the plant is known or has been surveyed?

- Yes = you know that the full extent of the population IS known.
- N = you know that the full extent is NOT known. This would be for instances where you know that there is more of the plant population out there, but you didn't get to see it all.
- ? = you are uncertain if the full extent is known. This would be for instances where you did a cursory look around the population for more, but you aren't certain you examined all of the available or suitable habitat.

EO Data: Most important is the number of plants and any other comments. Note if the population size is a precise count or an estimate. Please fill out other fields if you can. Comments can include things such as how much area was searched for the plants; how much of the searched area the plants covered; are stems scattered or clumped, or do they have some other distribution pattern; a brief word picture of the population; and any variations in size, health, or distribution of the population not well covered by checkoff items.

General Description: This is for the plant habitat. Name the associated natural community if you can. List some of the associated plants and the substrate type. Note elevation, aspect, PERCENT slope, light, topographic position, and moisture if you can.

Threats to Population: Indicate these if you can, note if there are none.

Conservation/Management/Research Needs: Do you see any needs for this plant population?

Did you take a photograph? For difficult species, please attach a copy. Did you collect a specimen? If yes, please give collection number (if there is one) and repository (even if it is your personal collection). Note if other members of the genus occur at this site, if there are hybridization issues, if there are identification issues.

Landowner information: Please include this if you can. If there are multiple landowners, list them all if you can. If you know tax map and lot numbers, please provide these. Do you know if the landowner is aware of the plant? Is the landowner protecting the plant?

EO RANKING

Current Condition: This section refers to the condition of the area within the plant habitat. We are looking for a "plant's eye view". Check off any disturbances observed, and describe how these may influence the success of the plant at the site (i.e., does the disturbance have a positive or negative effect?).

Condition is an integrated measure of the quality of biotic and abiotic factors, structures, and processes within the observed area, and the degree to which they may affect the continued existence of the plant at this location.

Components of condition for species are:
1) reproduction and health,
2) species composition and biological structure,
3) ecological processes, and
4) abiotic physical/chemical factors.

Factors to consider include evidence of regular successful reproduction, richness/distribution of species, presence of exotic/invasive species, degree of disturbance, changes to ecological processes, stability of substrate, and water quality.

Size/Quality: This is a quantitative measure of the area and/or abundance of the plant at this location.
Components of size are:
1) area of occupancy,
2) population abundance,
3) population density, and

4) population fluctuation.

Landscape Context: This section refers to the condition of the area surrounding the plant habitat. Is the area an undisturbed, functioning natural ecosystem? What are the current and past land uses? Is the habitat fragmented?

Landscape context is an integrated measure of the quality of biotic and abiotic factors, structures, and processes surrounding the observed area, and the degree to which they may affect the continued existence of the plant at that location.

Components of landscape context for species are:
1) landscape structure and extent,
2) condition of the surrounding landscape (i.e., community development/maturity, species composition and biological structure, ecological processes, and abiotic physical/chemical factors).

Factors to consider include connectivity, fragmentation/patchiness, stability/old growth of communities, richness/distribution of species, presence of exotic/invasive species, degree of disturbance, changes to ecological processes, stability of substrate, and water quality.

Overall Rank: This is the "score card" for the population relative to other populations in Maine of the same species. A=highest quality, D=probably not viable. Note that E is not worse than D, it denotes that the species is Extant.

Comments could include why you assigned a particular rank (e.g., largest population in the state; small population, excellent habitat; large population, fragmented habitat under development pressures), and also your experience with this species (how many populations have you seen? What geographic area have you observed this species in?).

MNAP reviewed/verified rank: Please leave this section blank. A botanist or ecologist at MNAP will review and verify the rank.

APPENDIX F

Summary Survey Results Table

GIS CODE	Date	Lead Surveyor Name	Quad Code Numeric	Quad Names	Town	Latitude	Longitude	Plant Name	Number of Individutals	Phenology (in leaf, bud, flower, fruit, etc.)	Associated Natural Community/Habitat	Associated Plant Species	Comments
NA	7/27/2018	Art Gilman				NA	NA	*Allium tricoccum*	NONE	NA			No plants found during revisit.
CASI01AR CASI02AR	7/3/2018	Art Gilman	44070A2	Lewiston	Lewiston	44.023698	-70.175755	*Carex siccata*	100 3000	in leaf, fruit	River bank terrace/Powerline corridor	Rubus flagellaris, Elymus repens	Two distinct areas of same population.
DRGO01AR	7/12/2018	Art Gilman	45069A7	Mahoney Hill	Moscow	45.117098	-69.861951	*Dryopteris goldiana*		in leaf, fruit	Hardwood Seepage Forest	Impatiens capensis, sedges, Betula alleghaniensis	Small area near open ROW, seepage area follows what appears to be an old logging road.
EA03AR	7/26/2018	Mao Lin	45069C8	The Forks	Moxie Gore	45.356975	-69.894886	Enriched Northern Hardwood Forest	NA	NA	Maple - Basswood - Ash Forest	Adiantum pedatum, Deparia acrostichoides, Fraxinus nigra, Carpinus caroliniana, Ulmus americana, Athyrium angustum, Impatiens capensis	Rich forest spanning drier areas of wetland, with loamy soils ranging from silty to sandy. Slight northern aspect, abundant maidenhair fern and only occasional basswood.
NA	7/27/2018	Art Gilman				NA	NA	*Fimbristylis autumnalis*	NONE	NA			No plants found during revisit.
GALKAM001DMC	7/11/2018	Duane Choquette	45070D4	Tumbledown Mountain	Appleton Township	45.466260	-70.468178	*Galium kamtschaticum*	506	leaf, bud, flower, immature fruit, mature fruit	Northern Hardwood Forest	Acer saccharum, Betula alleghaniensis, Acer pensylvanicum, Glyceria striata, Impatiens capensis, Thalictrum polygamin, Oxalis montana, Galium palustre, Circaea alpina, Sambucus racemosa	Large population along the edge of an old logging road and active moose trail. The surrounding land is all utilized for logging and is currently in a regenerative state from the last logging cycle.
GALKAM002DMC	7/11/2018	Duane Choquette	45070D4	Tumbledown Mountain	Appleton Township	45.466046	-70.469440	*Galium kamtschaticum*	16	leaf, flower, mature fruit	Northern Hardwood Forest	Acer saccharum, Betula alleghaniensis, Acer pensylvanicum, Glyceria striata, Impatiens capensis, Galium palustre, Circaea alpina, Sambucus racemosa, Corlus cornuta, Nabalus altissimus, Carex utriculata, Osmunda claytonia, Trillium undulatum	Small population. Site is a junction of two old logging roads, with a hillside seep upslope.
GALKAM003DMC	7/11/2018	Duane Choquette	45070D4	Tumbledown Mountain	Appleton Township	45.465980	-70.469568	*Galium kamtschaticum*	85	leaf, flower, mature fruit	Northern Hardwood Forest	Acer saccharum, Betula alleghaniensis, Acer pensylvanicum, Glyceria striata, Impatiens capensis, Carex utriculata, Osmunda claytonia, Carex gynandra	Small population. The surrounding land is all utilized for logging and is currently in a regenerative state from the last logging cycle. A recent clearcut is located <100 feet to the west of the sample site.
GERU01AR GERU02AR GERU03AR	7/6/2018	Art Gilman	45069A8	Bingham	Concord Twp	45.023784	-69.883264	*Gentiana rubricaulis*	29 120 4 1	in leaf	Mixed Graminoid - Shrub Marsh	Typha latifolia, Packera shweinitziana, Geum aleppicum, Thelypteris palustris, Platanthera psycodes	Four distinct areas of same population. Plants were growing along edge of cattail areas and up into the upland semi-forested areas along the edge of the ROW.
GERU04AR	7/11/2018	Art Gilman	45069A8	Pleasant Ridge Pit	Moscow	45.094096	-69.878232	*Gentiana rubricaulis*	300 300	in leaf	Mixed Graminoid - Shrub Marsh	Carex flava, Typha latifolia, Salix discolor	Two distinct areas of same population. Northern area goes about 30 ft into cedar swamp forested area west of the cleared ROW.
EA01AR	7/7/2018	Art Gilman	44070D2	Livermore Falls	Livermore Falls	44.403416	-70.148538	Hardwood River Terrace Forest	NA	NA	Upper Floodplain Hardwood Forest	Querus rubra, Betula alleghaniensis, Acer rubrum, Onoclea sensibilis, Athyrium angustum, Matteuccia struthiopteris, Osmunda claytoniana (interrupted fern)	Previously characterized as Maple-Basswood-Ash. Located on a river floodplain terrace. Presence of at least one butternut tree and trees are of large size with good forest structure and few invasives.

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EA02AR	7/27/2018	Art Gilman	44069G8	Madison West	Anson	44.853352	-69.886138	Hardwood River Terrace Forest	NA	NA	River Terrace Hardwood/Upper Floodplain Hardwood Forest	Quercus rubra, Fraxinus pennsylvanica, Ulmus americana, Lonicera morrowii, Onoclea sensibilis, Athyrium angustum, Matteuccia struthiopteris	On an upper terrace associated with Carrabasset Stream not for above its confluence with the Kennebec River (and likely back-flooded from the river at extremes). The community is dominated by green ash and red oak with minor component of elm. The age structure is young except for a few large red oak and green ash. The forest is rather heavily invaded by invasive honeysuckles (about 40%-50% cover overall, which is substantially more than observed in 2007). Understory herbs are typical, but lack elements of richness such as blue cohosh, wild leek, etc.
HOLO01AR	7/6/2018	Art Gilman	45069A8	Bingham	Moscow	45.067711	-69.898568	*Houstonia longifolia*	500	in leaf, bud, flower	Powerline ROW/Shallow marsh - sloping edge	Danthonia spicata, Centaurea stoebe, Juniperus communis, Drymocallis arguta, Lechea intermedia	Located on high river terrace, within the cleared powerline corridor on bare gravel soil; where lichens and juniper encroach, the plants are much less robust.
ISME01AR	7/5/2018	Art Gilman	44070B2	Lake Auburn East	Greene	44.221891	-70.168584	*Isotria medeoloides*	1	in leaf	Oak - Pine Forest	Tsuga Canadensis, Quercus rubra, Acer rubrum, Betula alleghaniensis	No herbs in immediate vicinity. Plant was growing on steep embankment leading to a small seasonal stream. Closed forest canopy, with thick litter layer and very little understory or groundcover.
JackPineWood004DMC	7/18/2018	Duane Choquette	45070D3	Spencer Lake	Bradstreet Township T4 R7	45.495680	-70.254000	Jack Pine Forest	NA	NA	Jack Pine Forest	Pinus banksiana, Pinus strobus, Picea rubens, Pinus resinosa, Huperzia lucidula, Vaccinium angustifolium, Pteridium aquilinum, Gaultheria procumbens, Cornus canadensis, Pleurozium schreberi	Jack pine forest northwest of Egg pond. The stand is bordered by three large logging cuts, to the north east, and west. The Jack pine Forest extends south outside of the study corridor. An examination of aerial photography and field reconnaissance shows the jack pine forest ending in a spruce bog community.
JackPineWood005DMC	7/18/2018	Duane Choquette	45070D3	Spencer Lake	Bradstreet Township T4 R7	45.496380	-70.257820	Jack Pine Forest	NA	NA	Jack Pine Forest	Pinus banksiana, Pinus strobus, Picea rubens, Pinus resinosa, Huperzia lucidula, Vaccinium angustifolium, Pteridium aquilinum, Gaultheria procumbens, Cornus canadensis, Pleurozium schreberi	Predominately Jack pine (90%), with mixed red pine and red spruce in the canopy. The understory is dry and open, with lowbush blueberries, laurels, and snowberries found sporadically in patches, with bracken fern present in areas where the canopy thins. The Jack Pine woodland abuts regenerating clear-cuts to both the east and west, which are dominated by young red spruce, though scattered young jack pines can be found throughout.

GIS CODE	Date	Lead Surveyor Name	Quad Code Numeric	Quad Names	Town	Latitude	Longitude	Plant Name	Number of Individutals	Phenology (in leaf, bud, flower, fruit, etc.)	Associated Natural Community/Habitat	Associated Plant Species	Comments
JackPineWood006DMC	7/18/2018	Duane Choquette	45070D2	Enchanted Pond	Bradstreet Township T4 R7	45.495550	-70.226780	Jack Pine Forest	NA	NA	Jack Pine Forest	Pinus banksiana, Picea rubens, Pinus strobus, Abies balsamea, Kalmia angustifolia, Vaccinium angustifolium, Pteridium aquilinum, Gaultheria procumbens, Cornus canadensis, Pleurozium schreberi, Huperzia lucidula	Predominately Jack pine (70%), with mixed red pine, red spruce, and balsam fir in the canopy. The understory is dry and open, with bracken fern and bunchberry found throughout. The Jack Pine Forest is fairly extensive, extending outside of the survey area to the north and south. The Forest also spans a large alder-dominant stream valley and two smaller wetland seeps. The Jack Pine gives way to a spruce and fir dominant forest to the south. Sugar maples saplings appear sporadically in the understory in the western edge of the Jack Pine Forest.
LINDU01AG	7/28/2018	Art Gilman	4407000	Wilton	Jay	44.54054	-70.163594	Lindernia dubia var. anagallidea	15-20	in leaf, mature fruit, seed dispersing	general forest/powerline/gravel pit	Juncus tenuis, Agalilnis tenuifolia	Very limited availabel habitat (mud-puddle damp, vs. dry sand surrounding).
TRCL01AR	7/12/2018	Art Gilman	45069A7	Mahoney Hill	Moscow	45.101345	-69.872975	*Trichophorum clintonii*	25	in leaf, bud, fruit	Powerline ROW	Pteridium aquilinum, Chamaepericlymenum canadense	Upslope from very actively eroding stream, on dry-gravely soils under bracken fern and in access road.

NA = Not Applicable